MARY DORA ROGICK

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TRANSACTIONS

OF THE

ROYAL SOCIETY OF VICTORIA.

VOLUME IV.

1895.

GIFT FROM Dr. DAVID A. BROWN .....
Oct 1956

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A MONOGRAPH OF THE TERTIARY POLYZOA OF VICTORIA,

By P. H. MacGillivray, M.A., LL.D. (With Plates, I.–XXII.).

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INTRODUCTORY NOTE.

It is necessary to say a few words with regard to the publication of this number of the Transactions. Dr. MacGillivray's paper was formally laid before the Society in December, 1894, and ordered by the Council to be printed and published. The manuscript and drawings remained in the possession of Dr. MacGillivray who, up to the time of his death, was busily engaged in superintending the drawing of the plates, and making the few additions necessary to render the letterpress and illustrations complete.

On the death of Dr. MacGillivray the whole of the plates, except Plate XV., had been lithographed, but only the first few pages of letterpress were in print. An examination of the manuscript showed that the descriptions of a small number of species, towards the end of the paper, were not complete, and that a few drawings remained to be made of certain species of Retepora the descriptions of which had been written. Those species of which the descriptions had not been written were already named and drawn by Dr. MacGillivray. Under these circumstances it was decided to print the manuscript without any additions or alterations, and to include the names of the species not described with reference to the plates in order to preserve Dr. MacGillivray's names already attached to them in manuscript.

The monograph so far as page 135 is therefore printed exactly in the form in which it was left by Dr. MacGillivray.

Mr. T. S. Hall very kindly undertook to write the descriptions of the species which were left incomplete by Dr. MacGillivray, and these have been inserted in the form of an appendix (pp. 136-146).

All the illustrations were complete except Figures 5, 14, 15, 16, 17, 18 and 19 on Plate XV.; these I have drawn from Dr. MacGillivray's named specimens, and I have also added an index to families, genera and species which will perhaps be found useful for purposes of reference.

It is hoped that but few errors have crept into the work, the greater part of which in passing through the press has, unfortunately, not had the advantage of being revised by the author. It will be noticed that the monograph refers exclusively to the species represented in Dr. MacGillivray's collection; whether or not it was his intention to have subsequently added references to species described by other workers, specimens of which were not in his collection it is impossible now to say. No manuscript or notes referring to such can be found, and it has been thought best therefore, with the exception of Mr. Hall's appendix completing Dr. MacGillivray's own work, to make no additions.

The type specimens have been purchased by the Trustees of the National Gallery and Museums of Victoria, and will be placed in the National Museum, Melbourne, to which Dr. MacGillivray had during his life-time generously presented his very valuable series of type specimens of recent Australian Polyzoa.

W. BALDWIN SPENCER, *Hon. Sec.*

CORRIGENDA.

Page 33.	Line 11.	For Calexchara read Caleschara.
Page 55.	Line 21.	For Goldfress read Goldfuss.
Page 62.	Line 20.	Add Pl. X., Fig. 27.
Page 65.	Line 24.	For Andouin read Audouin.
Page 66.	Line 24.	For Fig. 28 read Fig. 20.
Page 74.	Line 27.	For *Macnopora* read *Macropora*.
Page 95.	Line 17.	For Figs. 26, 29 read Figs. 26—29.
Page 100.	Line 28.	For *P. emendata* read *B. emendata*.
Page 115.	Line 15.	Add Pl. XV., Fig. 15.
Page 132.	Line 1.	For Fig. 4 read Figs. 4, 7.
Page 135.	Line 7.	For Figs. 8, 9 read Fig. 10.
Plate II.		For 1·01 inch read 0·01 inch.

A MONOGRAPH OF THE TERTIARY POLYZOA OF VICTORIA,

By P. H. MACGILLIVRAY, M.A., LL.D.

(With Plates I.—XXII.)

Read 13th December, 1894.

The Australian seas have long been known to be very rich in their Polyzoan fauna, the species of which also possess many characteristic features. Those occurring on the coasts of Victoria are now fairly well known, about 400 species having been accurately determined. In the other colonies so much attention has not been bestowed on them, and the numbers recorded are much smaller; but there is no doubt that further research will furnish an equally extensive list from their coasts.

In Victoria, as well as in South Australia, there are numerous tertiary formations containing large deposits of Polyzoa, the accurate determination of which, especially in relation to the living species, is of great geological interest. The present paper has been prepared as a contribution to that work. The localities which have furnished the specimens I have had at my disposal in its preparation are Bairnsdale, various localities in the Geelong district (Corio Bay, Waurn Ponds, Belmont, Moorabool, and Bird Rock), Muddy Creek near Hamilton, Lake Bullenmerri near Camperdown, and a section at Gellibrand. The material from Bairnsdale was supplied to me by Mr. Gregson, the specimens from the Geelong district, Lake Bullenmerri and Gellibrand by Mr. T. S. Hall, those from Moorabool by Mr. H. Grayson, and the material from Bird Rock by Mr. J. Dennant; and I have to thank these gentlemen for their kind assistance. The Schnapper Point and Muddy Creek specimens were collected by myself.

The papers already published on the subject with which I am acquainted are a list, without descriptions, by Mr. Busk, in the Quarterly Journal of the Geological Society of London for 1859, of species collected at Mount Gambier in South Australia by the Rev. J. E. Tenison Woods; papers by Mr. Woods himself in the Transactions of the Royal Societies of New South Wales, Victoria, and South Australia; a paper by Mr. J. Bracebridge Wilson on Fossil Catenicellæ, in the Journal of the Microscopical Society of Victoria; a Synopsis of the known species of Australian Tertiary Polyzoa by Mr. R. Etheridge, Junr., in the Transactions of the Royal Society of New South Wales for 1877; and a series of important papers by Mr. A. W. Waters in the Journal of the Geological Society of London. In the

last-mentioned papers Mr. Waters deals with specimens from various Victorian and South Australian deposits collected by Mr. Allen, Mr. Tenison Woods, Mr. Etheridge, and Professor Tate.

There can be no doubt that when other deposits from which I have no specimens are examined, the number will be very largely increased. Even of the deposits here dealt with, the only ones of which anything like an exhaustive examination has been made are those at Schnapper Point and Muddy Creek.

The most marked feature of the fossil species is their striking resemblance to those of the existing fauna. This is shown not only in the number of identical species, but also in the abundance of individuals of the same or closely allied forms. Thus, of the Cheilostomata, among the Catenicellidæ which at the present time are almost exclusively confined to the Australian seas, we have no less than forty species; and in this connection it is to be noted that the only species hitherto found fossil out of Australia are two recently recorded by Mr. Waters from North Italian Deposits in the Vicentine, which are referred to the Upper Eocene. The Adeonæ are largely represented and the Reteporæ are abundant, as are also Calescharа denticulata, Membranipora radicifera, Selenaria maculata, Steganoporella magnilabris, Porina gracilis, Lekythopora hystrix and various other markedly Australian types. The living Australian Cyclostomata do not present any special characteristics, and there is nothing particularly noteworthy among the fossils. Of the species not peculiarly Australian which are identical with recent species, most are cosmopolitan, as Membranipora savartii, Thalamoporella rozieri, Cribrilina radiata, Microporella ciliata and Lichenopora radiata.

The age of the deposits has been the subject of a good deal of discussion among geologists. They are now generally referred to the Oligocene or early Miocene, but some are considered by different authorities to belong to the Eocene. It is difficult, however, to believe that any of them can be so old as the Eocene, at least considering it to be comparable to that of Europe. So far as an opinion can be formed from an examination of the Polyzoa, they are not of very different ages.

The classification adopted is mainly that given in my catalogue of the Marine Polyzoa of Victoria, published in the Proceedings of this Society for 1886, with, however, some modifications.

The nomenclature is that in general use. The only innovation of any consequence I have made is the introduction of the term thyrostome (*θυρα, στομα*) for the opening through which the tentacles and oral extremity of the polypide are protruded. The terms orifice, oral aperture and mouth are inaccurate and confusing, and the proposed name will, I think, prove advantageous.

A large number of new species is proposed ; and it is not improbable that the examination of more extensive series of specimens than are at present available may eventually show some of these not to be entitled to specific rank, and others to be identical with species previously described. It is hoped, however, that the descriptions and figures will at all events prevent any difficulty in the recognition of those here dealt with.

I have to thank Mr. Wendel for the admirable manner in which he has lithographed my drawings.

ABBREVIATIONS USED.

References.

A.M.N.H. = Annals and Magazine of Natural History.

B.M.C. = Busk's British Museum Catalogue of Marine Polyzoa.

B.M.P. = Hincks' British Marine Polyzoa.

C.P. = Busk's Polyzoa of Challenger Expedition.

C.V. = MacGillivray's Catalogue of Marine Polyzoa of Victoria in T.R.S.V., 1886.

P.Z.V. = McCoy's Prodromus of the Zoology of Victoria, articles on Polyzoa, by P. H. MacGillivray.*

P.C.F. = Lamouroux's Polypiers Coralligènes Flexibles.

P.F.T.C. = D'Orbigny's Paléontologie Française, Terrains Crétacés.

Q.J.G.S. = Quarterly Journal of the Geological Society of London.

Q.J.M.S. = Quarterly Journal of Microscopical Science.

T.R.S.N.S.W. = Transactions of the Royal Society of New South Wales.

T.R.S.S.A. = Transactions of the Royal Society of South Australia.

T.R.S.V. = Transactions and Proceedings of the Royal Society of Victoria.

* Miss Jelly, in her valuable Catalogue of recent Marine Bryozoa, and several other authors have erroneously referred these descriptions to Professor McCoy, having overlooked the acknowledgment made at the end of each article. The quotation should be MacGillivray in McCoy's P.Z.V.

Localities.

B. = Bairnsdale.
B.R. = Bird Rock.
Belm. = Belmont.
C.B. = Corio Bay.
C.C. = Curdies' Creek.
G. = Gellibrand.
L.B. = Lake Bullenmerri.
M. = Moorabool.
M.C. = Muddy Creek.
S.P. = Schnapper Point.
W.P. = Waurn Ponds.

(W.) indicates that the locality is given on the authority of Mr. Waters.

TABLE OF CLASSIFICATION.

Class **POLYZOA.**

Order **Gymnolæmata**, *Allman.*
(= Infundibulata, Gervais).

Sub-order CHEILOSTOMATA, *Busk.*

Family LIRIOZOIDÆ.
Liriozoa, *Lamk.*

Family BIGEMELLARIIDÆ.
Bigemellaria, *n.g.*

Family CATENICELLIDÆ.

Catenicella, *Busk.*
Stenostomaria, *n.g.*
Strophipora, *n.g.*
Microstomaria, *n.g.*
Caloporella, *n.g.*
Claviporella, *McG.*
Ditaxipora, *n.g.*

Family CELLULARIIDÆ.

Menipea, *Lamx.*
Scrupocellaria, *Van Beneden.*
Caberea, *Lamx.*
Canda, *Lamx.*
Plicopora, *n.g.*

Family BICELLARIIDÆ.
Beania, *Johnston.*

Family CELLARIIDÆ.
Cellaria, *Lamx.*

Family FLUSTRIDÆ.
Craspedozoum, *McG.*

Family MEMBRANIPORIDÆ.

Membranipora, *Blainv.*
Amphiblestrum, *Gray.*
Lunulites, *Lamk.*
Selenaria, *Busk.*
Farcimia, *Pourtales.*
Calescharа, *McG.*

Family STEGANOPORELLIDÆ.

Thalamoporella, *Hincks.*
Steganoporella, *Smitt.*

Family Microporidæ.

Micropora, *Gray.*
Macropora, *n.g.*

Family Cribrilinidæ.

Membraniporella, *Smitt.*
Cribrilina, *Gray.*
Corbulipora, *n.g.*

Family Hiantoporidæ.

Hiantopora, *McG.*

Family Microporellidæ.

Microporella, *Hincks.*
Tessaradoma, *Norman.*
Adeona, *Lamx.*

Family Lepraliidæ.

Lepralia, *Johnston.*
Bulbipora, *n.g.*
Plagiopora, *n.g.*

Family Schizoporellidæ.

Schizoporella, *Hincks.*
Gemellipora, *Smitt.*
Haswellia, *Busk.*
Bipora, *Whitelegge.*
Adeonella, *Busk.*

Family Smittiidæ.

Porella, *Gray.*
Smittia, *Hincks.*
Cucullipora, *n.g.*
Pachystomaria, *n.g.*
Phylactella, *Hincks.*
Mucronella, *Hincks.*
Bracebridgia, *McG.*
Rhynchopora, *Hincks.*
Aspidostoma, *Hincks.*
Porina, *D'Orbigny.*

Family Tubucellariidæ.

Tubucellaria, *D'Orbigny.*

Family Prostomariidæ.

Prostomaria, *n.g.*

Family Bitectiporidæ.

Bitectipora, *n.g.*

Family Celleporidæ.

Lekythopora, *McG.*
Cellepora, *Fabricius.*
Schismopora, *McG.*

Family Reteporidæ.

Retepora, *Imperato.*

Sub-order CYCLOSTOMATA, *Busk.*

Family Crisiidæ.

Crisia, *Lamx.*

Family Idmoneidæ.

Idmonea, *Lamx.*
Filisparsa, *D'Orbigny.*
Hornera, *Lamx.*

Family Tubuliporidæ.

Tubulipora, *Lamx.*
Stomatopora, *Bronn.*
Diastopora, *Johnston.*
Liripora, *McG.*
Tecticavea, *D'Orbigny.*
Entalophora, *Lamx.*

Family Lichenoporidæ.

Lichenopora, *Lamx.*
Discofascigera, *D'Orbigny,*
Heteropora, *Blainv.*

Family Frondiporidæ.

Supercytis, *D'Orbigny.*
Fasciculipora, *D'Orbigny.*
Frondipora, *D'Orbigny.*
Discotubigera, *D'Orbigny.*

Sub-order CHEILOSTOMATA.

Family Liriozoidæ.

Zoarium calcareous, formed by a creeping stolon giving origin to jointed branches, each internode consisting of single modified tubular cells connected end to end by corneous joints. Zoœcia united laterally in clusters articulated to the sides of the internodes, subtubular, thyrostome oblique.

Liriozoa, *Lamarck.*

Zoœcia in clusters of three, consisting of a primary and two secondary united laterally to it; the primary zoœcium extending downwards and united by a corneous joint to an internode.

1. *L. lævigata*, Waters, sp. Pl. III., fig. 1.

Catenicella, lævigata, Waters, Q.J.G.S., Aug., 1883, p. 432.

Primary zoœcium compressed laterally, produced inferiorly as a long calcareous tube; thyrostome almost terminal, elliptical vertically; lateral zoœcia attached by their backs throughout their whole length to the primary, expanded above, thyrostome terminal, elliptical, with a sinus below, directed upwards and slightly outwards to the opposite aspect of that of the primary zoœcium.

M.C.; B.R. (W.).

Of this exceedingly interesting form I have only seen two specimens. It was described by Waters from Bird Rock, but the central zoœcium was not distinguished, and it was referred to Catenicella, a genus with which it obviously has no connection. It is very closely allied to the living West Indian *L. tulipifera*, from which it differs only in the absence of the small spine or process from the upper part of the peristome and in the much greater prolongation downwards of the primary or central zoœcium. The size of the zoœcia is the same. There is an obscure mark on the central stem opposite the base of the lateral zoœcia which may indicate the termination of the cell, but there is no articulation.

The recent species was first described as a Sertularian by Linnæus, then as a Cellaria by Ellis and Solander, who gave a good description and figure. Subsequently Lamouroux referred it, with a true Sertularian, to his genus Pasythea. Lamarck, about the same time, constituted a new genus, Liriozoa, for its reception. De Blainville gave it still another generic name, calling it Tuliparia. Hincks (A.M.N.H., 1881), gave an excellent description and figure under the name of *Epicaulidium pulchrum*, having overlooked the notices of the previous naturalists—an oversight which he shortly afterwards rectified. Lamarck's generic name seems to be that which should be retained.

Family Bigemellariidæ.

Zoœcia arranged in closely united pairs in continuous series on the upper part of a calcareous stem, the zoœcia of each pair facing in opposite directions and each pair placed at right angles to the succeeding and preceding pairs; thyrostome oblique, subterminal. Stems probably originating from a creeping stolon.

Bigemellaria, *n.g.*

Characters the same as for the family. Peristome raised, lower edge with a spout-like sinus.

1. *B. pedunculata*, n.sp. Pl. III., figs. 2, 3.

Lower half of each zoœcium closely united to the opposite zoœcium of the pair, upper part projecting forwards; anterior surface convex, punctate or perforated, bounded by a narrow raised line; thyrostome nearly terminal, rounded above and with a sinus in the lower lip; peristome slightly raised. The stem is formed by the prolongation downwards of the lower pair of zoœcia, the succeeding pairs of zoœcia being imbedded in the cavity formed by the divergence of the pair below. It is impossible to say whether the clusters are terminal or of how many pairs they may consist (one specimen has seven), as my specimens only show the prolongation downwards and not the superior termination.

M.C.; M.

The systematic position of this form is doubtful. I think it most probable that the clusters have originated from a creeping stolon as those of Liriozoa do. Of its generic distinction there can be no doubt.

Family Catenicellidæ.

Zoarium phytoid, erect, branched, segmented, each internode consisting of a single zoœcium, or of two or three united laterally, or of a double series of irregular number. Zoœcia all facing the same way; front entirely calcareous or membrano-calcareous; one or both margins (except in the central cell of the tricellular forms) expanded in its whole length or only superiorly, and usually supporting in the upper part a sessile or imbedded avicularium.

In this peculiarly Australian family the genera already proposed are Catenicella, Catenicellopsis, Claviporella, and Calpidium. Catenicella itself seems to me to require further subdivision, and I would restrict the genus to those forms hitherto included in Busk's fenestrate group. The Catenicellæ vittatæ I refer to a new genus, *Caloporella*. For Wyville Thomson's *C. Harveyi*, which he placed in a separate division, the fasciatæ, I would institute the genus *Strophipora*. I also propose the genus *Stenostomaria* for the *C. solida* of Waters, and *Ditaxipora* for the same author's *C. internodia*. A form here first described seems to require still another generic division for its reception, and I have accordingly named it *Microstomaria*. The genus Catenicella was first proposed by De Blainville, but not in the sense now used, and the species referred by him to it are now included in *Hippothoa*, *Catenaria*, *Encratea*. As already pointed out by Jullien (Cap Horn Bryozoaires, p. 1-4), it was first properly defined by D'Orbigny (P.F.T.C. 43), and adopted by Busk and others. D'Orbigny should clearly, therefore, be quoted as the authority for the genus. The genera which I propose to adopt are *Catenicella* (D'Orb.), *Stenostomaria* (n.g.), *Strophipora* (n.g.), *Catenicellopsis* (J. B. Wilson), *Microstomaria* (n.g.), *Claviporella* (McG.), *Ditaxipora* (n.g.), and *Calpidium* (Busk). *Catenicellopsis* I would restrict to *C. pusilla*, *C. delicatula* going to *Caloporella*, and *Calpidium* should include *C. ornatum* (Busk), and *Catenicella ponderosa* (Goldstein). Catenicellopsis and Calpidium have not as yet been found fossil.

The expanded lateral processes consist normally of three compartments or chambers, a central containing the avicularium, and a supra and infra-avicularian.

Catenicella, *D'Orbigny*.

Branches originating from the summits of each of a geminate pair. Zoœcia usually in series of unicellular internodes, but at a bifurcation geminate, rarely *(C. gemella)* each internode consisting of a geminate pair; front fenestrated, the fenestræ being simple and caused by a deficiency of calcareous matter or forming the entrances to horizontal, usually elevated, tubes directed inwards towards the mesian

line, in both cases covered by the epitheca; thyrostome large, higher than wide, arched above, lower margin straight and entire, or with a small rounded notch or a suboral pore.

1. *C. ventricosa*, Busk. Pl. I., figs. 1, 2.

C. ventricosa, Busk, B.M.C., i., 7 ; *id.* C.P., Pt. I., 10 ; McG., P.Z.V. 24.

Zoœcia ovate ; fenestræ 7, pyriform ; thyrostome with the lower margin entire or with a minute notch or suboral pore ; lateral processes of moderate size, usually straight and produced upwards. Posterior surface convex, smooth.

M.C.; B.R. (W.) A common living Australian species.

2. *C. nobilis*, n.sp. Pl. I., fig. 3.

Geminate pairs with the zoœcia slightly angled at the sides; fenestrate area with a slightly raised margin ; fenestræ 7, pyriform ; a lateral process at each upper and outer angle, supporting a large avicularium looking forwards ; thyrostome lofty, rather narrow, the lower margin with a deep sinus ; a narrow raised band extending upwards from behind the peristome. Posterior surface convex, smooth. Only geminate zoœcia seen.

Bairnsdale.

3. *C. ampla*, Waters. Pl. I., figs. 4, 5, 6.

C. ampla, Waters, Q.J.G.S., 1881, p. 317 ; *id.* 1883, p. 429.

Zoœcia ovate, with a distinct, raised, convex margin surrounding the fenestræ ; fenestræ 7 or 9, pyriform ; thyrostome with the peristome raised above, straight and entire below, the sides slightly contracted a little above the angles ; a short narrow ridge extending upwards from the middle of the upper lip ; lateral processes narrow, small, pointed and directed upwards. Posterior surface with a vertical depression extending the whole length, and two long depressions on each side facing outwards and backwards.

S.P.; M.C.; B.; B.R.; C.C. (W.)

The number of fenestræ is mostly 7, but in some specimens 9, as described by Waters. These forms do not, however, otherwise differ. The thickened marginal rim varies in amount of prominence, being larger in the single zoœcia and in the 7-fenestrated form.

4. *C. circumcincta*, Waters. Pl. I., fig. 7.

C. circumcincta, Waters, Q.J.G.S., 1883, p. 432.

Zoœcia ovate, elongated ; a submarginal row of about 11 round fenestræ extending to each side of the thyrostome ; thyrostome with the peristome raised above, the lower margin straight and entire, and slightly wider at the angles ; a

small distinct suboral pore; lateral processes pointed above. Posterior surface convex.

S.P.; M.C.; B.R. and W.P. (W.)

Mr. Waters gives no figure. His description is:—"Globulus ovate, with a row of large foramina round the margin of the zoœcium, and one pore below the aperture. Aperture large, rounded above, widest at the proximal end, which is straight. Oral aperture 0·08 millim. wide and 0·08 millim. long." I have only single zoœcia of this species.

5. *C. expansa*, n.sp. Pl. I., figs. 8, 9.

Zoœcia broadly ovate, fenestræ 9 in single, 6 or 7 in geminate zoœcia; thyrostome with the lower margin straight and a small suboral pore; lateral processes very broad, triangular, extending the whole length of the zoœcia and curved forwards, with a small avicularium at the angle, opening outwards. Posterior surface convex, finely sulcate.

M.C.

Allied to *C. circumcincta*, from which it differs in the greater width of the zoœcia and the large size of the wing-like lateral processes.

6. *C. mamillata*, n.sp. Pl. I., figs. 10, 11.

Zoœcia ovate; fenestræ 12-16, round, sub-marginal, extending to each side of the thyrostome; thyrostome lofty, with the peristome projecting above, slightly wider at the inferior angles, lower margin straight and entire; a small suboral pore; anterior surface convex and the geminate zoœcia, especially the upper, with a large mound-like elevation marked by several fine lines radiating from the suboral pore; lateral processes of moderate size. Posterior surface depressed.

S.P.; M.C.

Most of my specimens consist of geminate pairs of zoœcia. In these the mound-like striated elevation forms a marked feature; in the single zoœcia it is not nearly so prominent, but the front is more convex than in *C. circumcincta*. The posterior surface is slightly depressed.

7. *C. tenuis*, n.sp. Pl. I., figs. 12, 13, 14.

Zoœcia slender, elongated, convex, usually curved with the concavity forwards; a sub-marginal row of 11-15 large, round fenestræ; thyrostome lofty, straight below, and with a minute denticle above each lower angle; peristome slightly elevated; lateral processes broad and pointed above, and having an avicularium opposite the middle of the thyrostome.

S.P.; M.C.

A marked variety (fig. 14) occurs, having the zoœcia wider and the lateral processes very wide and slightly retrocedent, and with the posterior surface convex and minutely sulcate.

8. *C. pulchella*, Maplestone. Pl. I., fig. 15.

C. pulchella, Maplestone, Journ. Mic. Soc. Vict., May 1880; McG., P.Z.V. 89.

Zoœcia broadly ovate, smooth; a row of about 10 round, sub-marginal fenestræ extending to each side of the thyrostome; thyrostome straight below with a round sinus in the centre.

S.P. A living Victorian species.

In recent perfect specimens the lateral processes are conspicuous and extend nearly the whole length of the zoœcia. In the fossil they are worn off.

9. *C. elongata*, n.sp. Pl. I., fig. 16.

Zoœcia ovate, produced above and below; about 10 or 11 small, pyriform fenestræ arranged round the margin of an oval space occupying most of the front of the zoœcium and bounded by a thick, raised, marginal rim; thyrostome lofty, peristome of arched portion much thickened, contracted towards the straight lower margin and having a minute denticle above the angle on either side; a vertical thickened band extending from the middle of the peristome with a large supra-avicularian chamber or depression on each side; a tubular avicularian chamber on each side, opposite the middle of the thyrostome, lodging a minute avicularium; a long, narrow, infra-avicularian chamber or depression; on each side of the inferior prolongation of the single zoœcium or geminate pair a long, narrow chamber or depression. Posterior surface sharply convex.

S.P.; M.C.

Allied to *C. alata*, from which it differs in the narrower zoœcia and their superior and inferior prolongation, and the thicker margin enclosing the fenestrate space. Some of Waters' figures of *C. alata* are referable to this species. The two seem to me, however, to be sufficiently distinct.

10. *C. alata*, Wyville Thomson. Pl. I., fig. 17.

C. alata, Wyv. Thomson, Dublin Nat. Hist. Rev., April, 1858; McG., P.Z.V. 24; Waters, Q.J.G.S., 1881, p. 317.

Zoœcia broadly ovate; 7 or 8 rounded or pyriform fenestræ in a distinct space, the margin of which is very slightly thickened; thyrostome with a straight entire lower margin and a minute denticle on each side; lateral processes very wide, bearing a tubular avicularian chamber terminated by a minute avicularium, and

with very large supra- and infra-avicularian chambers or depressions; occasionally a second (pedal) chamber below the last. Posterior surface convex or carinate.

S.P.; M.C.; B. A living Australian species.

11. *C. crux*, n.sp. Pl. I., fig. 18.

Zoœcium nearly quadrate, narrowed above and with a long narrow prolongation below; a depressed area with six small fenestræ; thyrostome small, straight or slightly hollowed and entire below, and with a minute denticle on each side; a long, narrow avicularian chamber on each side, supporting a minute avicularium; a large supra- and a rather smaller infra-avicularian chamber; a long, narrow depression on each side of the inferior stem-like prolongation. Posteriorly, the inferior prolongation sharply convex, the convexity ending above in a prominent umbo.

S.P.; M.C.

Allied to the recent *C. carinata* and also to *C. alata* and *elongata*.

12. *C. porosa*, n.sp. Pl. I., fig. 19.

Of this I have only the single fragment figured, so that a full description is impossible. I have no doubt, however, that it is a good species. It presents an unusual arrangement in the true Catenicellæ in the oœcium being fixed on the front of a cell in a series instead of being terminal. The ordinary thyrostome is small, arched above, slightly hollowed and entire below, and with a minute denticle on each side. The aperture of the fertile zoœcium and oœcium is very wide, semilunar, the angles very sharp, and the lower margin with a large rounded sinus. There are several fenestræ on the front of the zoœcium of which enough, however, is not preserved to show their number and arrangement; and at the side immediately below the thyrostome there seems to have been a large anterior avicularium. The oœcium is large, nearly flat and slightly prominent, surrounded by a thick, raised, smooth band enclosing a nearly circular, minutely-perforated area. The posterior surface is rounded and smooth.

M.C.

13. *C. cribraria*, Busk. Pl. I., fig. 20.

C. cribraria, Busk, B.M.C., P. I., 9; *id.* C.P., p. 11; MeG., P.Z.V., 24.

Zoœcia broadly ovate; lateral processes of moderate size, with an avicularium opening outwards; anterior surface convex with an outer row of moderate-sized elliptical fenestræ and numerous smaller internal ones; thyrostome large, lower margin slightly convex upwards. Posterior surface smooth.

S.P.; M.C.; B.; M. Living, Australia.

14. *C. hastata*, Busk. Pl. I., figs. 21, 22, 23.

C. hastata, Busk, B.M.C., Pt. I., 7 ; *id.* C.P., 10 ; McG., P.Z.V., 24.

Zoœcia ovate ; front with a scutiform area, having on each side 5-9 fenestræ, between which are usually lines or fissures converging to a central line ; thyrostome straight below, with an internal denticle (usually absent) on either side.

S.P. ; M.C. ; B.R. and W.P. (W.). A common living Australian species.

The large lateral processes, so characteristic of the recent specimens, are wanting in the fossils, having been broken or worn off, but I think there can be little doubt of the identification. It is a very variable species, recent specimens differing in the form and size of the zoœcia, the form of the scutiform area, the number and appearance of the fenestræ, and the shape and size of the lateral processes. Normally the fenestræ are the openings of short horizontal tubes, but these are frequently indistinguishable, and the pores seem to open directly inwards. The lateral processes usually have the supra-avicularian portion pointed upwards, while in a common very massive form, which I was at one time inclined to describe as a new species, the lateral processes are thick, blunt or rounded above and considerably turned forwards. In the fossils the opening of the fenestræ into tubes is usually very apparent. The zoœcia are generally narrower than in the recent. They are also frequently produced above the thyrostome, and there is then a distinct narrow longitudinal ridge, which is absent in the recent specimens, owing to the thyrostome being situated almost at the summit of the zoœcium.

15. *C. retrorersa*, n.sp. Pl. I., fig. 24.

Zoœcia broadly ovoid or elliptical ; a row of fenestræ, about six on each side, round the margin, with grooves radiating from the central line ; thyrostome large, lofty, straight below; lateral processes very broad, extending the whole length of the zoœcia and turned backwards ; a marginal avicularium at each upper angle opening directly outwards.

M.C.

Allied in structure to *C. cribraria*, but distinguished at once by the broad, entire, retro verted lateral processes.

16. *C. marginata*, Waters. Pl. I., figs. 25, 26, 27.

C. marginata, Waters, Q.J.G.S., August, 1881, p. 317.

Zoœcia elongated, nearly cylindrical ; thyrostome large, straight below ; 8 or 9 fenestræ enclosed by a narrow, prominent, raised ridge ; zoœcia produced above the

thyrostome, with a narrow vertical ridge from its upper part. Posterior surface smooth.

S.P.; B.; C.C. (W.)

A well-marked species, readily distinguished by the prominent raised ridge surrounding the fenestrate area.

17. *C. dædala*, n.sp. Pl. I., fig. 28.

Geminate zoœcia broad, inclined at an angle to each other; fenestræ 7-12, pyriform, surrounded by a raised margin; thyrostome wide, rounded above, with entire lower margin and a denticle above the angles; peristome thickened above; a narrow raised ridge extending upwards, with a depression (supra-avicularian chamber) on each side; avicularian chamber short, broad, and with a small avicularium opening outwards; two depressions directed outwards and slightly forwards below the avicularium; a long, narrow depression between the zoœcia. Posterior surface convex, smooth.

S.P.; M.C.; B.; M.

At once distinguished by the massiveness and obliquity of the zoœcia. I have only seen geminate pairs.

18. *C. cincta*, n.sp. Pl. I., 29.

Zoœcia cuneiform; 7 fenestræ opening into tubes diverging from the central line, surrounded by a thick convex rim continuous with the thickened peristome; thyrostome rather lofty, straight below and with a small denticle above the angles; a narrow, raised, vertical ridge from the middle of the peristome; avicularian process wide, with a moderate sized avicularium opening outwards; on each side above the avicularium a long tubular process extending nearly directly upwards; two lateral depressions or chambers below the avicularium. Posterior surface convex, smooth.

M.C.

19. *C. lineata*, n.sp. Pl. I., fig. 30.

Zoœcia much elongated, narrow; a linear elevated tract extending nearly the whole length and formed by a double row of about 15 narrow tubes on each side, extending outwards from the central line, separated by deep grooves or fissures, and opening at the extremities by small round pores; lateral processes absent; thyrostome lofty, lower margin seemingly straight. Posterior surface convex, smooth.

S.P.

A very peculiar species, totally unlike any other. The tubes, with their terminal pores, are very distinct, and the dividing grooves in the only two specimens I have seen are mostly fissured right through.

20. *C. latifrons*, n.sp. Pl. I., fig. 31.

Zoœcia large, broad, ovate; whole front occupied by a double series of tubes diverging from a central line to the margin and separated by distinct wide grooves; a division of the tubes running down each side about mid-way between the central and distal ends; lateral processes rather small, and with an avicularium opening outwards; thyrostome large, arched and slightly pointed above, lower margin straight and entire. Posterior surface convex, smooth; on each side in the single zoœcia three depressions opening backwards and separated from the central tract by a narrow raised line.

S.P.

This is a well marked and peculiar species. The tubes extend from the central line to the circumference and are usually open in the outer part, although occasionally that part is closed and there is a fissure in the central division; the grooves are frequently fissured in the central half. There is a continuous mark down each side which gives the appearance of the tubes or pores consisting of two series, especially marked when the inner portions of the grooves are fissured through and the outer parts of the tubes are open. The geminate zoœcia do not show the posterior markings distinctly, but there is a series of depressions on the outer edges similar to those on the single zoœcia.

21. *C. auriculata*, n.sp. Pl. II., fig. 5.

Zoœcia elongated; an elevated scutiform area, with a row of about 5 large pyriform fenestræ on each side, directed from mesian line; thyrostome lofty, straight or slightly convex below; above the thyrostome a vertical raised line on each side of which is a depression; lateral processes small, prominent, with a distinct external avicularium opening outwards and slightly forwards; a long narrow depression on each side of the zoœcium below. Posterior surface smooth or faintly sulcate.

M.C.; B.

Allied to *C. hastata*, but much more slender and having the avicularian processes small and ear-like. In most of the fossil specimens of *C. hastata* the lateral processes are broken or worn off, so that they do not show their structure. In the specimens of the present species they are beautifully perfect and quite distinctive.

22. *C. stricta*, n.sp. Pl. II., fig. 6.

Zoœcia narrow, vase-shaped; 5 pyriform fenestræ; a sub-fenestral plate extending to the middle of the fenestræ; thyrostome lofty, straight and wide below; a vertical band upwards from the top of the peristome; lateral processes small, with a small avicularium on the outer edge opening directly outwards.

M.C.

I have only a single zoœcium, the posterior surface of which is broken but was convex. The posterior aspect of the sub-fenestral plates is seen through the fracture to be closely applied to the anterior wall, there being no cavity or chamber between them.

23. *C. intermedia*, McG. Pl. II., fig. 1.

C. intermedia, McG., P.Z.V., 24.

Zoœcia rather broad; 5 pyriform fenestræ separated by thick margins, the apices nearly meeting; a central internal plate extending to the middle of the fenestræ; thyrostome large, slightly contracted at the sides, straight below; one or two external depressions looking outwards and forwards. Posterior surface smooth.

B.; M. A recent Australian species.

24. *C. lunipora*, n.sp. Pl. II., 2.

Zoœcia vase-shaped, narrow; 5 large, somewhat lunate fenestræ; lateral processes small, erect; thyrostome straight below, slightly contracted at the sides; a narrow band extending vertically upwards from the peristome. Posterior surface depressed down the centre, two hollow spaces on each side opening outwards and backwards.

B.

25. *C. ovoidea*, n.sp. Pl. II., figs. 3, 4.

Zoœcia large, ovate; 7 large, pyriform fenestræ; lateral processes large; an internal calcareous plate extending to about half the length of the fenestræ; thyrostome large, lofty, arched above, with the lower margin slightly convex; peristome thickened above. Posterior surface smooth.

M.C.; B.; M.

26. ? *C. punctata*, n.sp. Pl. II., fig. 30.

Zoœcia ovate; an irregular series of small depressions or pores, double at the lower part, along the margin, and a few others in a depressed space below the thyrostome; thyrostome subcircular, straighter below; a nearly conical lateral process on one side (probably worn off on the other), surmounted by a minute avicularium. Dorsal surface smooth.

I am in great doubt where this species ought to go, and have provisionally placed it in Catenicella, as it seems to be one of the Catenicellidæ.

Stenostomaria, *n.g.*

Zoœcia broad; an elevated band or ridge down the centre; thyrostome rounded above, and with a narrow acutely pointed sinus in the lower margin, contracted at the base by a denticle on each side formed by an extension of the peristome, so

as to have a hastate form. Posterior surface with a grooved vertical ridge, on each side of which it is smooth. No fenestræ or true vittæ.

1. *S. solida*, Waters, sp. Pl. II., figs. 7, 8.

C. solida, Waters, Quart. Journ. Geol. Soc., 1881, p. 318.

Zoœcia ovate or broadly cuneiform; a raised vertical band directed downwards from the thyrostome; the sides depressed and smooth and entire, or with a row of pores; lateral processes extending from the upper angles as an acute triangular expansion with a conspicuous avicularium opening forwards or outwards. Posterior surface of the single zoœcia much depressed, with an irregular central series of pores and thickened margin on either side; in the geminate zoœcia a double ridge separating the zoœcia, and a raised central band down each zoœcium especially marked in the lower or primary; surface under the central band convex, and in some specimens with an almost globular elevation.

S.P., M.C., B., M.; C.C. and W.P. (W.)

It is difficult to place this form in any of the other divisions of the Catenicellidæ and I have, therefore, proposed a new genus for its reception. It differs from Catenicella proper in the structure of the thyrostome, from Calpidium in the peristome, although thickened, not presenting the lofty cucullate form of that genus, and from both in the absence of fenestræ; and from Claviporella in the large size of the zoœcia and the presence of the peculiar raised bands.

The globular posterior enlargement present in some specimens is very peculiar and suggests the possibility of its being an oœcium, although the situation would almost preclude that idea.

Strophipora, *n.g.*

Zoœcia destitute of fenestræ or vittæ, with a vertical thickened band descending downwards from the thyrostome, and one or more similar bands on the posterior surface; thyrostome large, similar to that of Catenicella, arched above and straight below.

1. *S. harveyi*, Wyville Thomson, sp., Plate II., figs. 9–12.

Catenicella harveyi, Wyv. Thomson, Dublin Nat. Hist. Rev., April, 1858, p. 137; Waters, Q. J. G. S., Aug., 1883, p. 431.

Zoœcia ovate; a vertical raised band extending directly downwards from the middle of the lower margin of the thyrostome, dividing a short way down to enclose a small circle and again uniting; a raised band separating the zoœcia of a geminate

pair; thyrostome with a thickened peristome and a denticle on each side; a slightly pointed lateral process on each side bearing an oval, elliptical or triangular avicularium directed forwards or outwards. Posterior surface with a simple vertical raised band similar to that on the front.

Var. *porosa*. A series of pores on each side of the raised band in front.

Var. *lata*. Distinguished by its much greater width.

S.P.; M.C.; B.; W.P. and B.R. (W.) Dredged in Bass's Straits by Professor Harvey, but, so far as I know, not since found living.

Microstomaria, *n.g.*

Zoœcia small, without fenestræ or vittæ; thyrostome small, nearly circular and projecting forwards.

1. *M. tubulifera*, n.sp. Pl. II., fig. 29.

The only specimen I have seen is the single geminate pair of zoœcia figured. The zoœcia are very small, narrow, the surface with very minute perforated papillæ and faintly corrugated; each outer angle is produced into a delicate tubular process open at the extremity; there are no avicularia; the thyrostome is circular and almost tubular from the elevation of the peristome.

M.C.

The difference in the form of the thyrostome necessitates the formation of a new genus for this minute species. It is possible that the tubular processes are really avicularian.

Caloporella, *n.g.*

Zoœcia small, mostly narrow and elongated; a lateral or anterior usually linear depression (vitta of Busk) on each side, with a single or double series of pores; thyrostome small, subcircular or with the lower margin straighter and usually having a small denticle on either side.

I propose this genus for the Catenicellæ vittatæ of Busk. It differs from Catenicella in the zoœcia being small and usually narrow, in the absence of fenestræ and the presence of linear lateral narrow depressions usually perforated by pores, and in the smaller size and more circular form of the thyrostome.

1. *C. insignis*, n.sp. Pl. II., figs. 13, 14.

Zoœcia somewhat cuneate; convex and smooth in front; vittæ generally narrow, but occasionally broader, lateral and extending the whole length;

thyrostome subcircular, the lower margin straight and probably with a slight sinus, a minute denticle on each side; lateral processes thin and rather narrow. Posterior surface convex and smooth.

S.P.; M.C.

The Schnapper Point specimens are larger and the vittæ wider than in those from Muddy Creek; and I am not sure that they ought not to be referred to distinct species.

2. *C. speciosa*, n.sp. Pl. II., fig. 15.

Zoœcia elongated, narrow; an entirely lateral, rather wide vitta, with two rows of pores, extending the whole length of the zoœcium on each side; thyrostome lofty, rather narrow, arched and somewhat pointed above, contracted towards the straight lower margin. Posterior surface smooth.

S.P.

I have only the single geminate pair of zoœcia figured. It is allied to *C. fusca* (McG.), from which it differs in the wider vittæ and the thyrostome being much narrower and pointed above. The zoœcia, moreover, are straight, and not curved as in the recent species. The lateral processes are not very perfect. They, however, seem to have been rather small with an avicularium opening outwards.

3. *C. hannafordi*, McG. Pl. II., figs. 16, 17.

Catenicella hannafordi, McG., P.Z.V., 24.

Zoœcia broad, ovate or pyriform; vittæ lateral, wider below; thyrostome rounded above, hollowed below, with a minute denticle on either side; a long narrow depressed mark or slit on each side of the thyrostome extending upwards and outwards on the large lateral processes. Posterior surface smooth.

M.C. Recent Australian.

I refer this species somewhat doubtfully to the recent *C. hannafordi*, with which the resemblance is only seen after calcination. In the fossils the lateral oral mark is larger than in recent specimens and the vittæ do not extend so high up.

4. *C. teres*, n.sp. Pl. II., figs. 18, 19.

Zoœcia small, elongated, nearly cylindrical, smooth; vittæ very narrow, linear, extending the whole length of the zoœcia; thyrostome rounded; lateral processes small, supporting minute avicularia. Zoœcia of geminate pairs very distinctly separated behind.

M.C.

5. *C. prælennis*, n.sp. Pl. II, fig. 20.

Zoœcia small, very slender; a very narrow vitta on each side extending the whole length of the zoœcium; lateral processes small, at the upper angles of the zoœcia, with a minute avicularium opening outwards; thyrostome subcircular, the lower margin straight and slightly thickened. Posterior surface smooth.

M.C.

Allied to the recent *C. venusta*, but I have no doubt distinct. I have only seen the geminate pair of zoœcia figured.

6. *C. sacculata*, Busk sp. Pl. II., fig. 21.

Catenicella sacculata, Busk, C.P., Pt. I., p. 12.

Zoœcia narrow, elongated, smooth; a long marginal vitta extending almost the whole length of the zoœcium on either side; thyrostome subcircular, the lower margin straighter and with a slightly rounded marsupium-like elevation immediately below; lateral processes small with an avicularium opening outwards.

M.C. Also living in the South Atlantic.

This is undoubtedly identical with the *C. sacculata* dredged by the Challenger Expedition off the coast of Brazil, and it is certainly a good species.

Claviporella, *MeG.*

Zoœcia small; thyrostome narrow, arched above, contracted below and extending downwards as a deep notch; lateral processes various, usually supporting large avicularia which may, however, be aborted or absent.

1. *C. vespertilio*, n.sp. Pl. II., fig. 22.

Zoœcia small, rounded, projecting forwards, produced below into a long calcareous tube and expanded above into large wing-like lateral processes.

S.P.; M.C.

I am very doubtful of the position of this species. In the Muddy Creek specimen the thyrostome is small, contracted below so as to form a large sinus, and the lateral processes are very long and sharply pointed. In that from Schnapper Point the thyrostome is larger, without contraction and straight below, the difference being obviously owing to the latter having been worn. Pending the discovery of other specimens I refer it doubtfully to the present genus, believing it not unlikely that it may not be a member of the Catenicellidæ at all.

2. *C. longicollis*, Waters, sp. Pl. II., figs. 23-25.

Catenicella longicollis, Waters, Q.J.G.S., Aug. 1883, p. 432.

Zoœcia broadly cuneate; below the thyrostome a long, narrow, elliptical space surrounded by a narrow raised rim, and situated in a depression of the zoœcium; this space occupied by a row of narrow bands on each side extending inwards to the mesial line where they meet; thyrostome rounded above, narrow or triangular below, the peristome slightly raised; lateral processes wide, with a gaping avicularium opening outwards. Sometimes an avicularium on the inner summit of one of the zoœcia of a geminate pair. Posterior surface convex, smooth.

Var. *angusta*. A single specimen (fig. 23) with the zoœcia much narrower and the lateral processes aborted or possibly broken off.

M.C.

The characteristic feature of this species is the suboral concave space with the minute transverse ribs. These ribs are like, but very much smaller than those of the front of Membraniporella, but the front formed by them is concave.

3. *C. obliqua*, n.sp. Pl. II., fig. 26.

Geminate zoœcia inclined obliquely to each other; a raised portion of the zoœcium extending downwards from the thyrostome, bordered by a row of minute pores; thyrostome rounded above, with a denticle on either side separating a pointed sinus, and several small pointed open tubes on its upper margin; lateral processes small, with a small avicularium opening backwards.

M.C.

I have only a single geminate pair of zoœcia. It may possibly be *C. longicollis*, but it differs in the obliquity of the zoœcia, the elevation below the thyrostome and the distinct, short tubular processes on the upper lip.

4. *C. marionæ*, n.sp. Pl. II., figs. 27, 28.

Zoœcia vase-shaped or cuneiform; connecting tubes very long; anterior surface smooth; thyrostome round and wide above, with a triangular sinus below; peristome thickened above; lateral processes usually large and supporting an avicularium (frequently absent) on the outer edge, with the elongated triangular mandible opening directly outwards or slightly backwards. Posterior surface raised towards the mesial line, smooth. In geminate zoœcia there is frequently a mark on each side, close to the junction above, which seems in some cases to be a minute avicularium.

S.P.; M.C.

Named after my youngest daughter.

I suspect that Waters may have, probably from imperfect specimens, confused this with his *C. longicollis*, overlooking the absence of the depressed ribbed area, and taking the specific name from the long tubular connecting tubes which are much more marked in the present species.

Ditaxipora, *n.g.*

Zoœcia alternate in two contiguous rows facing the same way, distinct but closely united; upper outer angle produced and pointed, bearing a sessile avicularium with long triangular mandible and sharp upturned mucro. Oœcia large, imbedded in the zoœcia above.

1. *D. internodia*, Waters, sp. Pl. II., fig. 31.

Catenicella internodia, Waters, Q.J.G.S., Aug., 1881, p. 318; *id.* Aug., 1883, p. 430.

In this species the zoœcia are arranged alternately in two rows, closely united laterally and longitudinally; the terminal zoœcia of an internode are single. All the specimens are more or less damaged, none representing an entire internode. In some specimens there are 7 or 8 zoœcia. The zoœcia have a broad raised band down the middle, with a groove in its centre. Each margin of the zoœcium is raised, leaving a depressed portion on either side of the central band, on which are usually found a few small pores; above the thyrostome there is frequently a band stretching to the summit of the zoœcium "with a small band to one side by which it is sometimes replaced." Thyrostome, when perfect, rounded above, contracted below the middle third by a small sharp process or denticle on each side, beneath which is a broad pointed sinus. The upper and outer angle of each zoœcium bears a large avicularium with triangular mandible opening directly forwards and with a sharp upturned beak. The posterior surface is thickened round the margin, within which is a lozenge-shaped depression deepest in the centre and having several small pores. I have only seen one oœcium, shown in the figure; the front is broken off.

There are some points in Mr. Waters' description with which my specimens do not agree, but they are of no specific value. Thus, he describes an oval space below the mouth surrounded by the division of the central band, and says that a pore or corresponding mark is always present in the middle of this band.

It is somewhat difficult to be certain of the systematic position of this species, but I agree with Mr. Waters in placing it in the Catenicellidæ. I, however, think

that the characters are such as to require the formation of a new genus. In a paper on North Italian Bryozoa (Quart. Journ., Geol. Soc., Feby., 1891) Mr. Waters describes some fossils with the same arrangement of the zoœcia (*Catenicella septentrionalis* and *C. continua*) in which there is a double row of zoœcia in each internode. Under the former, he says that he has specimens consisting of 1 or 2 zoœcia, one with 3 and one with 4, as well as another with a larger number in the internode (the latter, however, he considers may be another variety). The zoœcia in *C. septentrionalis* have much the appearance of those of the ordinary vittate species (Caloporella) without the vittæ.

M.C.; M.; B.R.; C.C. (W.).

Family Cellulariidæ.

Zoarium erect, branched, continuous or articulated. Zoœcia all facing the same way, in single or multiple series, or arranged around an imaginary axis; partly or wholly open and membranous in front. Avicularia, when present, sessile.

Menipea, *Lamouroux.*

Zoarium articulated, or rarely continuous. Zoœcia bi- or multi-serial, oblong, imperforate behind. A sessile lateral avicularium (frequently absent), and one or two sessile avicularia (also frequently absent) on the front of the zoœcia. No vibracula.

1. *M. alternata*, n.sp. Pl. III., fig. 7.

Zoœcia alternate, in two rows, elongated, narrow; aperture (area?) elliptical, with a thickened, elevated margin; five spines above and a slight projection on the inside for the articulation of a scutum or opercular spine; lower two-thirds of area filled in by a thin, depressed calcareous membrane or plate; lateral avicularia large, at the upper extremity of the zoœcium, opposite the area, opening upwards and slightly outwards; no anterior avicularia. Posterior surface smooth.

M.C.

2. *M. lineata*, n.sp. Pl. III., fig. 8.

Zoarium narrow, convex, consisting of two lateral and one central rows of zoœcia, the lateral opposite each other and alternate with the central. Zoœcia elongated, very narrow below, expanded above; area large, oval, with a thickened margin; a spine on each side at the junction of the upper and middle thirds of the area; a sessile avicularium in the central zoœcia, below the area, with the mandible

opening upwards and to one side; no avicularia on the lateral zoœcia. Posteriorly the two lateral series of zoœcia distinct, the median only indicated by a slight separation between the lower parts of the lateral zoœcia.

M.C.

Ought perhaps to be referred to Cellularia.

3. *M. crystallina*, Busk.

Emma crystallina, Busk, B.M.C., Pt. I., p. 28; *id.* C.P., 23; *Menipea crystallina*, McG., P.Z.V., 58.

Of this well-known recent species I had a single perfect internode from Muddy Creek, but it was unfortunately lost without a figure having been drawn.

Scrupocellaria, *Van Beneden.*

Zoarium articulated, dichotomously branched. Zoœcia bi-serial, quadrate, furnished with oval spines; a sessile avicularium at the upper and outer angle, and a vibraculum in a sinus on the outer and lower part behind.

1. *S. crenulata*, n.sp. Pl. III., figs. 4, 5, 6.

Zoœcia six or more in an internode, elongated, lower part smooth; aperture occupying from a third to a half of the front, contracted at the upper fourth by an eminence for the articulation of the scutum on the inner side, and a thickening on the outer side (for attachment of a spine?); margin with narrow, thickened, crenulated rim below the contraction; a small, hammer-shaped scutum (mostly worn off) on a rather long peduncle projecting over the aperture; two spines at the outer angle and one at the inner above the attachment of the scutum; lateral avicularia large, with pointed, upturned mucro; a considerable sessile avicularium on the front of the zoœcium below the aperture. Zoœcia posteriorly smooth; vibracular cells pyriform, lower part occupying the whole width of the zoœcium, the groove oblique (not transverse). Oœcia globular, adpressed.

M.C.

Waters in his papers gives *S. scabra*, from Muddy Creek and Bird Rock, without figure or description, and possibly the present form is the one meant. It is, however, undoubtedly distinct from the living northern species of which I have excellent specimens from Greenland.

Caberea, *Lamouroux.*

Zoarium continuous or imperfectly jointed, dichotomously branched. Zoœcia bi-multiserial, quadrate. Avicularia, when present, sessile on the outer side or

front of the zoœcia. Vibracula large, on the back of the branches, biserial, each common to several zoœcia.

1. *C. grandis*, Hincks. Pl. III., fig. 9.

Caberea grandis, Hincks, A.M.N.H., July, 1881, McG., P.Z.V., 136.

Branches rather broad, ligulate. Zoœcia multiserial; aperture large, oblong, two spines on the outer and one on the inner angle of the marginal zoœcia; one spine at each upper angle of the central; a short clavate scutum on a thick pedicle projecting over the aperture; a minute avicularium on the anterior edge of the outer margin of the lateral zoœcia; one or two avicularia at the base of the other zoœcia. Oœcia flat, mitriform, with a thickened rim. Dorsal surface entirely obscured by the vibracular cells which are distinct, almond-shaped, those of opposite sides meeting in a groove in the centre.

M.C.; B.; M. Living. Australia.

Some of the specimens distinctly show the various characters given. None, however, have the large vicarious avicularia usually seen in recent specimens.

2. *C. darwinii*, Busk. Pl. III., figs. 10, 11. = not the sp. of later, p. 17

Caberea darwinii, Busk, C.P., Pt. I., p. 29; MacGillivray, P.Z.V., 137.

Branches rather narrow. Zoœcia biserial, elongated; area large, partly filled in by a granulated expansion with a thickened crenulated margin; aperture elliptical, over-arched by a rather large scutum; one or two spines at the upper and outer angle. A small avicularium on the outside of each lateral zoœcium, and a sessile avicularium at the base of each peduncular spine. Posteriorly vibracular cells much elongated, fusiform. Oœcia smooth.

M.C. Recent Australia, New Zealand and Southern Ocean.

Canda, *Lamouroux*.

Zoarium dichotomously branched; branches articulated, connected also by transverse chitinous tubes attached at either end to a vibraculum. Avicularia large, situated on a special tract on the front of the branches, between the rows of zoœcia. Each zoœcium with a vibraculum posteriorly.

1. *C. fossilis*, Waters. Pl. III., figs. 12, 13, 14.

C. fossilis, Waters, Q.J.G.S., 1881, p. 322.

Branches narrow. Zoœcia biserial, elongated; upper extremity recedent, with a short, sharp process at the angles where it turns back; aperture extending three-

fourths of the length of the zoœcium, wide above, narrowed below; margin (including sometimes the whole anterior surface) crenulated and finely granular; a sessile avicularium at the inner side opposite the middle of the aperture. Oœcia globular, sub-immersed, turned towards the mesian line, surmounted by an avicularium. Posteriorly the outline of zoœcia oblique; the vibracular cells extending slightly beyond the mesian line. Below the vibracula a large pore for the attachment of a radical tube.

M.C.; B.R.; M.; W.P. and C.C. (W.)

Of this species there are two varieties. In the one, that figured by Waters, the aperture is very narrow and pointed below; while in the other (fig. 14) it does not extend so far down, and is rounded and not so narrow.

2. *C. inermis*, n.sp. Pl. III., fig. 15.

Branches narrow. Zoœcia biserial, elongated; aperture occupying three-fourths of the front, with raised, finely-crenulated margins, the upper end slightly retrocedent, but with no spines at the angles. No avicularia. Posteriorly the outline of the zoœcia as in front, the vibracular cells with the groove extending beyond the mesian line.

M.C.

Of this I have only the fragment figured. It has a considerable resemblance to the recent *C. tenuis* (McG.), but differs in the total absence of avicularia. It is possible, however, that other specimens may show them. From *C. fossilis* it differs in the form of the aperture, the absence of the superior spines, and of the internal avicularia.

Plicopora, *n.g.*

Zoarium in linear, uniserial, articulated branches, each internode consisting of a single zoœcium. Zoœcia broad, thick, greater part of the front occupied by an elliptical aperture surrounded by a plicated ridge.

1. *P. dædala*, n.sp. Pl. IV., fig. 4.

Zoœcia broad below, narrow and rounded above; aperture occupying the greater part of the front, the margin thickened and smooth, surrounded by a narrow plicated ridge; a small round pore below the aperture and close to the ridge. Posterior surface smooth, with on each side at the base an elevated grooved ridge turning upwards and outwards by a sharp angle towards the middle; towards the upper part is a large rounded opening, possibly for a radical tube. On each lateral edge of the zoœcium inferiorly is a small, elliptical, immersed avicularium.

S.P.; only two separate zoœcia seen.

Family Bicellariidæ.

Zoarium phytoid, erect and continuous, or adnate. Zoœcia continuous, loosely united or disjunct and connected by corneous tubes, obconic or boat-shaped, wholly or partly open in front. Avicularia, when present, pedunculate, capitate, altered in form or aborted.

Beania, *Johnston*

(Including Diachoris, *Busk*).

Zoarium creeping or loosely adnate. Zoœcia disjunct, connected by (usually) corneous tubes, erect or decumbent, ovate or boat-shaped, entirely open in front and filled in by thin membrane. Usually a capitate, pedunculate avicularium on one or both sides towards the upper extremity.

1. *B. spinigera*, McG.

Diachoris spinigera, McG., P.Z.V., 36.

I have a single specimen of a Diachoris from Schnapper Point, in a broken calcareous nodule, showing only the posterior surface. It is impossible to say to which species it belongs, but it seems to be *B. spinigera*.

Family Cellariidæ.

Zoarium erect, branched and cylindrical, or quadrate, with the Zoœcia arranged around an imaginary axis, or expanded lobed and bilaminate. Zoœcia separated by raised margins, with depressed entirely calcareous surface. Oœcia internal and opening by a special pore.

Cellaria, *Lamouroux*.

(=Salicornaria, auct.)

Characters as for the family.

1. *C. angustiloba*, Busk, Pl. III., fig. 16.

Melicerita angustiloba, Busk, Q.J.G.S., xvi., 261; Tenison Woods, T.R.S.V., 1861, p. 5; Stoliczka, Foss. Bryoz., Orakei Bay, in Palæontology of Novarra Exp., p. 155; *Cellaria angustiloba*, Waters, Q.J.G.S., Jan., 1882, p. 260.

Zoarium consisting of compressed, ligulate, bilaminate branches. Zoœcia hexagonal, in regular transverse rows, separated by sharply defined raised margins, depressed towards the centre, surface finely granular; thyrostome arched above, lower edge with a broad plate projecting upwards and two short sharp denticles

projecting downwards from the upper margin; lateral zoœcia more oblique and with the outer part produced as a wing-like expansion of the thin edge of the zoarium. Avicularia on the extreme edge of the zoarium on separate areas replacing zoœcia, transversely linear or narrowly elliptical, pointed at each side and with the margin thickened and finely crenulated; from each angle internally a slender, acicular, calcareous denticle or spine extending horizontally inwards.

S.P.; M.C.; B.; B.R.; C.B.

Waters describes and figures the avicularium as having an internal plate with a sinus, but this structure is in reality two internal nearly horizontal spines or sharp, elongated denticles. In one specimen there is a longitudinal series of several zoœcia which are wider and have the thyrostome wider and shallower; unfortunately, the upper part of all these zoœcia is broken off, so that no pore, if such exists, is seen, but they are almost certainly fertile.

The genus Melicerita, as proposed by Milne Edwards and adopted by Busk, differs only from Cellaria (=Salicornaria) in having the zoarium compressed instead of being cylindrical as in the latter, a character obviously of no generic value.

2. *C. acutimarginata*, n.sp. Pl. III., fig. 17.

Branches compressed, ligulate, bilaminate, with sharp edges. Zoœcia alternate in longitudinal series, hexagonal or rhomboidal, margins narrow, slightly raised, surface depressed minutely granular; thyrostome occupying the second fourth of the length, large, arched above, nearly straight or slightly projecting below, with two sharp denticles from the lower lip connected by a slight plate, and two small similar denticles from the upper edge.

S.P.; M.C.

Readily distinguished from the last species by the different arrangement of the zoœcia. I have not seen avicularia or ovarian pores.

3. *C. contigua*, n.sp. Pl. III., fig. 18.

Cellaria malvinensis, Waters, Q.J.G.S., 1881, p. 321.

Branches cylindrical. Zoœcia contiguous in longitudinal series, elongated, usually hexagonal, margins raised; surface considerably depressed, smooth or very minutely granular; thyrostome lofty, lower lip bulging forwards and upwards, with two short, stout, sharp denticles. Avicularia intercalated between the zoœcia laterally, mandible long, acute, directed upwards.

S.P.; M.C.; B.; B.R.; C.B.; Belm.; W.P. and C.C. (W.).

I cannot agree with Waters in referring this species to Busk's *Salicornaria malvinensis*. The zoœcia are much elongated and disposed alternately in longitudinal series so that they are contiguous end to end, the upper and lower extremities being broad and nearly straight, while in *C. malvinensis* the zoœcia are uniformly broadly hexagonal or rhomboidal, opposite laterally and distant longitudinally, their extremities being pointed. The shape of the zoœcia in this genus is certainly not a very reliable character, being subject to considerable variation in some of the species, but in the numerous specimens I have examined of the present form, and recent *C. malvinensis* from New Zealand, the arrangement is constant. The avicularia also are not exactly similar, the lower angles of the mandibles in *C. malvinensis* being sharper and longer.

4. *C. australis*, McG. Pl. III., fig. 19.

Cellaria fistulosa, var. *Australis*, McG., P.Z.V., 49; *C. Australis*, McG., T.R.S.V., 1884; *C. fistulosa*, Waters, Q.J.G.S., 1881, p. 319; *Salicornaria clavata*, Busk, C.P., Pt. I., p. 88.

Branches cylindrical. Zoœcia contiguous, much elongated; margins raised; surface depressed, granular; thyrostome a little above the middle, lower lip slightly projecting forwards and with two minute denticles. Avicularium occupying a separate area above a zoœcium; mandible broad, directed upwards. Ovarian pores rounded.

S.P.; M.C.

I have some doubt whether this, which is a rare species in the deposits, should be referred to *C. australis* or *C. fistulosa*, in both of which the avicularium is of the same character, and which are otherwise closely allied. The former is usually larger and has the secondary branches rising from the sides of the cylinders. In the fossils I cannot see any marks of the lateral branches; but as *C. australis* is a common Australian species, while *C. fistulosa* has not, so far as I know, been found here living, I think it better to refer the present form to the former species. In recent specimens there is no difficulty in the discrimination, especially as the opercula afford very distinctive characters.

5. *C. rigida*, McG. Pl. III., figs. 20-24.

Cellaria rigida, McG., P.Z.V., 105; *Salicornaria simplex*, Busk, C.P., Pt. I., 883.

C. perampla, Waters, Q.J.G.S., Jan., 1882, p. 260.

Branches cylindrical. Zoœcia rhomboidal, quadrate, or hexagonal; contiguous in longitudinal series; thyrostome in upper third, lower lip with a projecting plate

excavated in the middle so as to form two stout, sharp teeth, or with two distinct teeth; two similar denticles from the upper lip, but situated more posteriorly. Avicularium replacing a zoœcium, upper margin raised and over-arching, mandible very large and semicircular.

Var. *perampla*, Waters. Zoœcia elongated, quadrate or hexagonal, truncated above and below.

Var. *renusta*, fig. 24. Branches slender. Zoœcia very long, upper part enlarged, lower contracted. Ovarian pore a narrow transverse slit.

S.P.; M.C.; B. Recent Australia.

In the recent typical *C. rigida* the zoœcia are exceedingly regular in their shape, being almost uniformly rhomboidal, with a sharp angle above and below; occasionally, however, they are slightly truncated. Characteristic specimens occur among the fossils. The form described by Waters as *C. perampla* differs only in the zoœcia being much more elongated, with the ends straight, so that the outline is hexagonal or nearly quadrate. The avicularia also seem to be rather smaller. In the var. *renusta* the zoœcia are very long, the upper part being enlarged and the lower contracted, the latter part being occasionally extremely narrow.

6. *C. gracilis*, Busk. Pl. III., fig. 26.

Salicornaria gracilis, Busk, B.M.C., Pt. I., p. 17; C.P., Pt. I., p. 93.

Cellaria gracilis, McG., P.Z.V., 49.

Branches slender, cylindrical. Zoœcia distant longitudinally; separated by narrow raised margins; an inner raised ridge, wide and cucullate above, less prominent and forming an angle below, enclosing a depressed surface; thyrostome with the lower lip rounded and projecting forwards, with a minute denticle on each side. Avicularia on special cells, with the upper margin projecting forwards.

S.P.; M.C. Living. Australia.

7. *C. divaricata*, Busk. Pl. III., fig. 25.

Salicornaria divaricata, Busk, C.P., Pt. I., p. 90; *Cellaria divaricata*, McG., C.V.

I have a few small fragments which I refer rather doubtfully to this recent species, a full description of which is given in the "Challenger" Polyzoa. They may, however, belong to *C. bicornis* or *tenuirostris*, the descriptions of which are also given in the same place. The discrimination of the smaller, and in fact of all

the species of this genus, without the avicularia and chitinous parts is so difficult that a satisfactory determination is frequently impossible.

8. *C. laticella*, n.sp. Pl. III., fig. 27.

C. oricellosa, Waters, Q.J.G.S., 1881, p. 321.

Zoœcia quadriserial, ovate, distant longitudinally, separated by narrow raised lines, within which they are much and abruptly raised, sloping inwards to the central part, which is much depressed, especially below the thyrostome; thyrostome lunate, upper lip finely crenulated, lower much depressed.

S.P.

This is evidently the *C. oricellosa* of Waters, but I doubt the correctness of his identification with Stoliczka's species, and therefore describe it as new.

PALEONTOL

9. *C. dennanti*, n.sp. Pl. XXII., fig. 14.

Zoarium consisting of long, thick cylinders. Zoœcia alternate in longitudinal series, rhomboidal; margins thick; front depressed, finely granular; thyrostome, occupying the upper half of the zoœcium, semicircular, lower margin straight or slightly convex upwards, with a conspicuous internal denticle on each side. Avicularian cells replacing ordinary zoœcia in a series, than which they are larger; opening for mandible broad, rounded above, occupying the middle third, its lower edge with a rounded notch, from each side a slight elevation extending outwards to the margin.

Cape Otway, Mr. Dennant.

I have much pleasure in associating with this species the name of Mr. Dennant, who is well known for his many valuable contributions to the geology of Victoria. It is notably distinct from any other species with which I am acquainted, from all of which it is distinguished by the very peculiar and characteristic avicularian cells.

10. *C. cucullata*, n.sp. Pl. XXII., fig. 15.

Zoarium cylindrical. Zoœcia alternate in longitudinal series, hexagonal; margin broad, raised, rounded and sloping inwards, finely granular; thyrostome occupying the middle third of the zoœcium, subquadrate, narrower below; peristome forming a thin, sharp, raised margin; no internal denticles. Ovarian pores very large, occupying the whole of the front of the zoœcium above the thyrostome. Avicularian cells replacing ordinary zoœcia in a series, larger, the upper part forming a finely-granular hood arching over the opening; on each side of the large opening below a small round depression, with its thickened margin encroaching on the opening.

Cape Otway, Mr. Dennant.

I have only a single specimen of this very interesting form. The thyrostome differs from that of the other species in its thin raised peristome. The ovarian pores are very large, when fully formed occupying the whole of the upper part of the zoœcium between the peristome and the cell margins. The avicularia are somewhat similar to those of the smaller *C. gracilis.*

Family Flustridæ.

Zoarium expanded, flexible, membrano-calcareous, erect, foliaceous, ligulate or spirally twisted round an imaginary axis, uni- or bilaminate. Zoœcia elongated, separated by raised margins; front entirely membranous, or partly filled in by a thickened calcareous lamina.

Craspedozoum, *McG.*

Zoarium erect, in ligulate divisions, uni- or bilaminate, each branch bordered throughout its whole extent by a bundle of radical fibres springing from the bases of the lateral zoœcia. Zoœcia quadrate, aperture partly filled in by a thickened lamina. Oœcia external.

1. *C. roboratum*, Hincks, sp. Pl. IV., fig 5.

Membranipora roborata, Hincks, A.M.N.H., Aug., 1881; Waters, Q.J.G.S., 1883, p. 433; *Craspedozoum roboratum* and *ligulatum*, McG., P.Z.V., 177; *Flustra membraniporides*, Busk, C.P., Pt. I.; p. 54.

Zoœcia largely open in front, the aperture partly filled in below by a narrow granular lamina; a spine at each upper angle; one or two sessile auricularia on rounded eminences below the aperture. In recent specimens the oœcia somewhat mitriform, the upper rim thickened, and a depressed area inferiorly.

M.C.; W.P. (W.) Living. Australia and New Zealand.

In P.Z.V., to which I refer for full descriptions and figures, I described three species. Of these, however, *C. roboratum* and *C. ligulatum* differ chiefly in the former being bilaminate, the latter being unilaminate and narrower. These differences are scarcely of specific value, and I, therefore, now unite the two forms. The fossils which I have seen are unilaminate.

Hincks referred this species, but somewhat doubtfully, to Membranipora; and Waters (A.M.N.H., Sept., 1887) agrees with him, uniting also all my three species in one. *C. spicatum*, however, is totally distinct in essential specific characters.

Family Membraniporidæ.

Zoarium membrano-calcareous or calcareous, encrusting and expanded and continuous, or in branched series of zoœcia, or erect and uni- or bilaminate, or having the zoœcia arranged round an imaginary axis. Zoœcia usually (but not invariably) separated by raised margins; front entirely or partly occupied by a large area, which is wholly membraneous or partially filled in by a thickened lamina; operculum incomplete. Furnished with avicularia or vibracula.

The division of this large family into genera is exceedingly difficult, and no satisfactory arrangement has as yet been proposed. In my Catalogue of the Victorian Polyzoa, I adopted the genera Pyripora, Electra, Bathypora, Membranipora, Amphiblestrum, Biflustra and Calescharа as being at least convenient. The differences, however, between Membranipora and Biflustra are so slight that I think it is advisable to include them in the one genus. Amphiblestrum, although sometimes difficult to clearly differentiate, has, I think, sufficiently distinctive generic characters, and I, therefore, retain it. I here include also the genera Farcimia, Selenaria and Lunulites. The last two are usually considered as forming a family by themselves, but in essential characters they agree with the other Membraniporidæ, and in my opinion should be associated with them.

In describing the species of this family, the area is the whole front within the margins, the aperture the part entirely open (in living specimens filled in by a thin chitinous membrane and carrying the opercular flap), and the lamina the calcareous or membrano-calcareous layer extending from the margins to the aperture.

Membranipora, *Blainville*.

Zoarium usually encrusting, or sometimes erect and expanded or cylindrical. Zoœcia with the area occupying the whole front or with part of the zoœcium produced below; area entirely membranous, so that the aperture corresponds with its whole extent, or slightly filled in by a lamina.

1. *M. radicifera*, Hincks. Pl. IV., figs. 6, 7.

M. radicifera, Hincks, A.M.N.H., July, 1881; Waters, Q.J.G.S., 1882, p. 262; *Beania radicifera*, McG., P.Z.V., 117.

Zoarium expanded, attached by numerous radical tubes springing from the backs of the zoœcia. Zoœcia ovate or elliptical, very deep, with narrow raised margins, separated from each other by round openings which are more distinct behind, the intervening portions being six calcareous tubes uniting each zoœcium with six others (as in Busk's genus *Diachoris*, now merged in *Beania*); anterior

extremity of zoœcium elevated; usually two simple or furcate spines at the anterior extremity, occasionally absent, the anterior edge being then wide and smooth; on the margin at one side a sessile avicularium raised on a broad process, the mandible directed anteriorly and the rostrum terminating in a pointed, slightly-curved beak; on the opposite margin, nearer the oral extremity, is a conspicuous spine or process (frequently absent), simple, furcate or branched. Dorsal surface convex, covered with numerous tubercles marking the attachments of the radical tubes.

S.P.; M.C.; M. A common living Australian species.

This is a most interesting species, marking the transition from Beania (including Diachoris) to Membranipora. I have previously included it in the former genus, with which it agrees in the disjunction of the zoœcia and the elevation of their anterior extremities. The avicularium also, although subsessile and fixed, shows a marked approach to the pedunculate forms found in Beania. I now, however, think that on the whole it has more intimate relation to Membranipora, and I, therefore, follow Hincks in referring it to that genus. In some of the Schnapper Point specimens there is no appearance of the avicularium, while in others from that deposit and Muddy Creek its situation is indicated by a long narrow space in the cell-wall.

2. *M. intermedia*, Kirkpatrick, var. Pl. IV., fig. 8.

Membranipora radicifera, var. *intermedia*, Kirkpatrick, Proc. Roy. Dublin Soc., 1890.

This species differs from the last in the avicularium being more prominent and projecting over the area, the beak being large, covered with tubercles, and having from the lower end a large branching, usually cervicorn process extending nearly horizontally inwards; the spines on the opposite margin usually branched.

M.C. Living. Torres Straits.

This agrees closely with the form described by Kirkpatrick, the only difference being in the larger development of the avicularium, the base of which is also thickly covered with small pointed tubercles, and in the greater extension of the cervicorn process. Hincks (A.M.N.H., Dec., 1891, p. 479) suggests that Kirkpatrick's specimens may be the young state of *Hiantopora ferox* (McG.). My specimens, however, are undoubtedly fully developed. The avicularia are different, being more prominent and more erect. The branching processes from the base of the avicularium are also more erect and distinct than those by the coalescence of which the perforated front wall of Hiantopora is formed, and in fact in one specimen they extend over and beyond the opposite margin. They are of the same nature as the branched processes or spines of the recent Australian *M. cervicornis* (Busk).

3. *M. striata*, n.sp. Pl. IV., figs. 9, 10.

Zoarium unilaminate, probably encrusting or adnate. Zœcia very large, rounded or ovate, united in front, closely connected behind by very short calcareous tubes; aperture occupying the whole area, ovate, with a thickened, concentrically striated margin, which is raised at the distal end, where it is slightly incurved and smooth externally. Avicularia between the zoœcia, small.

S.P.; M.C.

Var. *orbicularis*. Zoœcia large, nearly orbicular, the margin more prominent, smooth and not specially raised at any part. Avicularia numerous, situated between the margins.

S.P.

In this very marked species the zoœcia are very large and deep, united at their margins in front. Posteriorly they are convex, closely connected by calcareous tubes, which are so short as to be in many instances indistinguishable. It is allied to *M. radicifera* in the tubular connection of the zoœcia. From the presence in some specimens of minute pores on the posterior surface, it is probable that it has been attached by small radical tubes. The variety *orbicularis* ought perhaps to be separated as a distinct species, distinguished by the rounded form of the zoœcia and the absence of the raised, smooth, inturned portion of the margin found in the normal form. In some specimens, however, there are indications of this structure.

4 *M. marginata*, n.sp. Pl. IV., fig. 11.

Zoarium bilaminate, dividing into narrow flat branches. Zoœcia large, alternate in longtitudinal series, elongated with rounded angles, separated by raised margins; a smooth lamina sloping inwards; aperture elliptical, occupying about two-thirds of the area, with a distinct thickened margin.

S.P.; M.

On the margins are a few obscure markings, which may possibly indicate the attachment of lateral spines. It is characterised by the smooth, highly calcified lamina and the very distinct rim round the aperture.

5. *M. elliptica*, n.sp. Pl. IV., fig. 12.

Zoœcia elongated, continuous and indistinct longitudinally; area elliptical, occupying the whole of the front except a small portion below, with thickened, smooth or very minutely crenulated margins.

S.P.; M.C.

Differs from the next species in the narrowness of the zoœcia and the different form of the area.

6. *M. cyclostoma*, n.sp. Pl. IV., fig. 13. Pl. XXII., fig. 12.

Zoarium probably bilaminate. Zoœcia large, somewhat quadrate, but bulging at the sides, continuous and indistinct longitudinally, separating readily laterally; area subcircular, occupying nearly the whole of the front, but in some cases a slight extension of the cell below; margins slightly thickened, smooth and with a very narrow distinct rim within.

S.P.; M.C.

Fig. 13, in Pl. IV., is from an imperfect specimen and does not properly shew the structure, which is much better seen in the figure in Pl. XXII.

7. *M. profunda*, n.sp. Pl. IV., fig. 14. Pl. VIII., fig. 2.

Zoarium encrusting or bilaminate. Zoœcia large and broad, slightly angular, separated by narrow raised lines, from which the thick granular margins slope abruptly downwards and inwards; avicularia situated at the junction of three zoœcia, rounded above and straight below.

S.P.; M.C.

8. *M. macrostoma*, Reuss. Pl. IV., figs. 15, 16.

Cellaria macrostoma, Reuss. Foss. Poly p. d. Wiener tert., p. 64; *Membranipora macrostoma*, Waters, Q.J.G.S., Aug. 1881, p. 323; *M. coronata*, Hincks, A.M.N.H., Feb. 1881; *Biflustra coronata*, McG., T.R.S.V., Nov. 1890.

Zoarium erect, branched dichotomously, branches subcylindrical or (usually) flattened and bilaminate, occasionally crustaceous. Zoœcia alternate in longitudinal series, elongated, oblong, separated by distinct narrow raised margins, a granular lamina sloping inwards; aperture elliptical or ovate, occupying about three-fourths of the area, margin thickened; a small sessile avicularium (occasionally absent), placed transversely or obliquely, at the summit of each zoœcium.

S.P.; M.C.; B.; M.; C.B. Living. Philippines and Australia.

I am not quite satisfied that this is the species described by Reuss. It is, however, undoubtedly that so named by Waters, and I am also satisfied that it is identical with the *M. coronata* described by Hincks from the Philippines and by myself from Australia.

9. *M. sculpta*, n.sp. Pl. V., fig. 1.

Zoarium encrusting. Zoœcia distinct, very irregularly arranged, usually elongated, elliptical or rounded, or occasionally angular; margins, sharp, thick,

sloping abruptly downwards and inwards, strongly granular, the granulations arranged in centripetal rows; aperture occupying almost the whole of the area, its edges crenulated; avicularia very large, replacing zoœcia, a granular and ridged calcareous lamina sloping inwards, very largely developed in the mandibular portion, where it occupies more than half of the cavity, much narrower in the posterior portion, a stout arched calcareous bar dividing the two parts; occasionally other smaller avicularia intercalated among the zoœcia. Oœcia prominent, the proximal margin thickened and with a narrow raised band extending upwards.

S.P.; M.C.

This beautiful species is allied to *M. crassimarginata* (Busk), from which it differs in the structure of the oœcium and especially in the mandibular part of the avicularium, being largely filled in by the sculptured calcareous lamina.

10. *M. geminata*, Waters. Pl. V., fig. 2.

Membranipora geminata, Waters, Q.J.G.S., 1881, p. 325.

Zoarium adnate or bilaminate and branched. Zoœcia elliptical, alternate or irregularly arranged; margins raised and thick, with a series of about 20 spines; a very narrow lamina sloping abruptly inwards; aperture occupying almost the whole of the area; frequently a slight extension of the zoœcium downwards below the margin of the area; avicularia (frequently absent) rounded, on the margins usually below and to one side of the zoœcium. At the upper extremity, inside the aperture, there is a sloping calcareous plate with a depression on each side.

S.P.; M.C.; B.R.; M.; C.C. (W.)

11. *M. depressa*, n.sp. Pl. V., fig. 3.

Membranipora maorica, Waters, Q.J.G.S., 1881, p. 325.

Zoarium usually cylindrical in Vincularia form, but occasionally broad and bilaminate. Zoœcia large, broad, rounded above; margins thick and granular, with a granular lamina sloping from the edges to the much depressed centre; aperture occupying about one-third of the area, rounded above, straight below, slightly contracted at the sides which are granular or crenulated; avicularia intercalated among the zoœcia in separate granular areas, mandible very long, pointed upwards.

S.P.; Bel.; C.C. (W.).

This species was referred by Waters to Stoliczka's *Vincularia maorica*, a determination with which I cannot agree. Waters himself subsequently gives Stoliczka's species as identical with *Eschara sexangularis* (which he includes in *Monoporella*), to which he also refers T. Wood's *E. clarkei*, and proposes that the present form should be named var. *minima* or *tuberculata*, Q.J.G.S., 1885, p. 291.

12. *M. concinna*, n sp. Pl. V., fig. 4.

Zoarium bilaminate. Zoœcia irregular in shape, rounded above, separated by thick, raised, strongly-granulated margins, surmounted by a narrow smooth raised line and descending abruptly to the flat granular lamina; aperture occupying about one-fifth of the area, extending laterally to the margins, the lower edge straight or with a slight sinus at each angle; avicularian cells intercalated among the zoœcia, granular, the triangular mandible directed upwards.

S.P.

Distinguished by the abruptness with which the margins descend to the broad, nearly flat, granular lamina, and the width of the aperture which extends quite to the margins.

13. *M. delicatula*, Busk. Pl. V., fig. 5.

Biflustra delicatula, Busk, Crag Polyzoa, p. 72; MeG., P.Z.V., 57; *Membranipora delicatula*, Hincks, A.M.N.H., July, 1880; *M. savartii*, Waters, Q.J.G.S., 1885, p. 286.

Zoarium bilaminate. Zoœcia quadrate but bulging on the sides; margins granular; a granular lamina filling part of the area below; aperture rounded or elliptical, occupying three-fourths of the area.

B. Living. Australia.

Var. *aciculata*, MeG. Pl. V., fig. 9.

Biflustra aciculata, MeG., T.R.S.V., Nov., 1890.

Having a row of very minute acicular denticles projecting inwards from the edge of the aperture.

M.C. Living. Port Jackson.

14. *M. savartii*. Pl. V., figs. 6, 7.

Biflustra savartii, MeG., T.R.S.V., Nov., 1890; ? *Membranipora trifolium*, var. *minor*, Hincks, A.M.N.H., July, 1880.

Zoarium encrusting. Zoœcia ovate or elliptical; area partly filled in by a sloping, finely-granular narrow lamina; aperture elliptical, occupying the greater part of the area; zoœcia extending slightly below the area; small avicularia, with the mandibles directed upwards, generally placed on each side of the base of a zoœcium.

M.C Living. Australia.

15. *M. papyracea*, n.sp. Pl. V., fig. 8.

Zoarium thin, unilaminate and probably encrusting. Zoœcia quincuncial, hexagonal but with the upper angles rounded off, separated by very narrow raised margins; a broad, very thin and slightly granular lamina sloping inwards; membrane covering the aperture membrano-calcareous, but very thin.

B.R.

A very delicate species, distinguished by its papery appearance. Parts of the covering membrane are preserved in all the zoœcia as an excessively thin calcareous layer.

16. *M. perfragilis*, McG. Pl. V., figs. 10, 11.

Biflustra perfragilis, McG., P.Z.V., 57; *Membranipora id.* Hincks, A.M.N.H., Oct. 1884.

Zoarium bilaminate, thin. Zoœcia elongated, rounded above; aperture occupying about four-fifths of the area, elliptical, its margins thickened and very finely granular; the lamina confined to the lower part of the area; avicularia as long as, but narrower than the zoœcia which they replace, slightly contracted at the base of the mandible, which is long, broad and directed upwards.

M.C. A common living Australian species.

17. *M. gregsoni*, n.sp. Pl. V., figs. 12, 13, 14.

Zoarium bilaminate. Zoœcia large, very deep, rounded or elliptical; margins thick, rounded, finely granular; avicularia small, transverse, with long setiform mandibles, situated on large bullate processes at the base of the zoœcia.

M.C.; B.; B.R.

At once distinguished by the very peculiar avicularia. These are situated on large bullate projections at the bases of the zoœcia; the basal portion is very small, and there is a long narrow fissure, seemingly for the lodgment of a setiform mandible, extending transversely to one side. When the front of the bullate process is worn off, as is usually the case, there is left a large circumscribed cavity, the real nature of which would be unintelligible without a knowledge of uninjured specimens. Occasionally, in addition to the vibraculoid avicularia, there are other short and broad avicularia projecting into the bases of the apertures of the zoœcia.

I have much pleasure in dedicating this species to Mr. Gregson, to whom I am indebted for the material I have examined from Bairnsdale.

18. *M. fossa*, n.sp.. Pl. V., fig. 16.

Zoarium bilaminate, thick. Zoœcia indistinct, narrow elliptical, with thick granular walls; aperture occupying quite or nearly the whole area, contracted at the junction of the upper and second fourths.

W.P.

The specimens are not in a very good state of preservation, but it seems distinct from any described species. The walls of the zoœcia are continuous, flat and finely granular, and the separating line can only be defined with difficulty. The aperture (corresponding to nearly the whole area) looks as if punched out of a thick calcareous layer.

19. *M. cochleare*, n.sp. Pl. V., figs. 17, 18.

Of this I have only two single zoœcia. The upper portion is much enlarged, ovate or rounded, with a thick margin within the base of which is, in one specimen, a broad internal plate; the lower part of the zoarium is narrow, flat or depressed and much prolonged.

S.P.; M.

The zoarium has probably been bilaminate. The inferior plate is of the same nature as the denticle or plate found in some specimens of *M. delicatula*.

20. *M. ambigua*, n.sp. Pl. VI., fig. 12.

Zoarium bilaminate. Zoœcia elongated, somewhat quadrate or nearly hexagonal; margins thick, raised, strongly granular, abruptly sloping to the equally granular lamina, which is very much depressed anteriorly, where it ends in a broad, nearly quadrate, slightly upturned prolongation or plate with a distinctly thickened rim; aperture occupying about a third or a fourth part of the area and reaching on each side to the margin; avicularia intercalated among the zoœcia, anterior extremity pointed and raised, the sides granular and sloping to an elongated opening.

S.P.

21. *M. bidens*, Busk, sp. Pl. VI., fig. 13.

Membranipora bidens, Busk, Crag Polyzoa, p. 34; *Micropora hippocrepis*, Waters, Q.J.G.S., 1882, p. 264.

Zoarium bilaminate. Zoœcia alternate in regular linear series, quadrate, elongated; margins thick, granular; lamina depressed, granular; aperture at the extreme upper end of the zoœcium, shallow, the lower edge turned forwards as a broad denticle or plate, usually slightly hollowed in the middle and with the margin slightly thickened.

W.P. Living. Mediterranean.

This agrees with Busk's description and figure, but I doubt whether it is the *Cellepora hippocrepis* of Hagenow. The character of the broad plate on the lower edge of the aperture, which is similar to that of the last species, makes it probable that when better specimens are available, it will be found that both species should be referred to *Steganoporella* or a new genus of which *S. palula* would be the type.

Amphiblestrum, *Gray.*

Zoarium encrusting or erect. Area occupying the whole front or with part of the zoœcium produced below; area partly filled in by a membrano-calcareous or calcareous lamina.

1. *A. simplex*, n.sp. Pl. V., fig. 20.

Zoarium cylindrical. Zoœcia elongated, quadrate, alternate in longitudinal series, separated by distinct raised margins, the transverse portions of which are prominent; aperture occupying rather more than half the area, elliptical, extending quite to the margins above, edges smooth and slightly thickened, lamina smooth or faintly granular. No avicularia.

S.P.; M.C.

2. *A. bursarium*, McG. Pl. V., fig. 22.

Membranipora rossellii, McG., P.Z.V. 26; *A. bursarium*, McG., T.R.S.V.; July, 1886.

Zoarium encrusting or loosely adnate. Zoœcia elongated, quadrate, with prominent crenulated margins; about two-thirds of the area filled in by a thin calcareous lamina; aperture with the lower edge usually oblique, but sometimes straight or irregular.

S.P. Living. Victoria.

Closely allied to the recent *A. rossellii*, from which it differs in the shape of the zoœcia. In recent specimens the avicularium, which I have not seen in the fossils, is very peculiar; it is situated in a special cell, the mandible narrow below, broad and expanded above and directed upwards. Avicularia have not been observed in *A. rossellii*. Failing these, it is difficult to say whether the two are specifically distinct, as the difference in the zoœcia is scarcely sufficient to rank them as such.

3. *A. arethusa*, D'Orbigny, sp. Pl. V., fig. 21.

Eschara arethusa, D'Orbigny. P.F.T.C., p. 127; *Membranipora arethusa*, Waters, Q.J.G.S., Aug., 1883, p. 434.

Zoarium in narrow, flat, bilaminate branches. Zoœcia quincuncial, separated by raised margins, elongated, hexagonal; aperture occupying about half the area, not quite reaching the margins of the zoœcium, with a slightly thickened and raised rim; lamina calcareous, finely granular.

M.C.; B.R.; W.P. (W.)

4. *A. coriense*, n.sp. Pl. VI., fig. 1.

Zoarium unilaminate. Zoœcia large, regularly arranged alternately in longitudinal series, hexagonal; margins raised, finely granular; aperture occupying about half the area, trifoliate; lamina minutely granular, sloping. Avicularia very large, situated between the zoœcia, lower part finely granular, with a longitudinal narrow opening, mandibular portion very long, curved and scimitar-shaped, being obliquely truncated at the extremity. Oœcia prominent, rounded, finely granular, thickened at the inferior edge, especially in the middle. Zoœcia posteriorly distinct, enlarged above, narrowed below, with a large circular mark (probably indicating the attachment of a radical fibre) in the centre of each.

C.B.

Allied to *A. flemingii* and *A. trifolium*. The only avicularium present in the specimen is that figured. In one or two only of the zoœcia, all of which are surmounted by oœcia, there are indications of a spine at an upper angle.

5. *A. permunitum*, Hincks, sp. Pl. V., fig. 19.

Membranipora permunita, Hincks, A.M.N.H., 1881; *Amphiblestrum permunitum*, McG., P.Z.V., 106; *M. michaudiana*, Waters, Q.J.G.S., Aug., 1885, p. 289.

Zoarium encrusting. Zoœcia elongated, wider at the middle; margin raised, granular; a finely granular lamina sloping anteriorly to the aperture, which occupies about a third of the area and has a straight lower border; avicularia at the base of aborted zoœcia, with a falciform mandible directed upwards and to one side. Oœcia small, prominent, rounded, a semicircular or triangular space in front marked off by a slightly raised band, the upper angle of which frequently projects forward as a point.

M.C. Living. Australia.

Waters refers this species to D'Orbigny's *Cellepora michaudiana*, a determination which seems to me at least doubtful, and I, therefore, retain the name by which the recent form is known.

6. *A. annulus*, Manzoni, sp. Pl. VI., fig. 3.

Membranipora annulus, Manzoni, Bryoz. Foss. Ital., 1*a*, cont., p. 7; *id.*, Bryoz. di Castacaro, 12; Waters, Q.J.G.S., 1887, p. 47; *M. dentata*, Waters, Q.J.G.S., 1883, p. 263; *? M. gatelta*, Busk, P.M.C., Pt. II., p. 62; *id.*, Zool. Kerguelen Isl., Phil. Tr. CLVIII., 195.

Zoarium encrusting. Zoœcia irregularly arranged, distinct, short and wide; margins raised, the upper part thickened and projecting forwards, with four large spines situated two on each side; area largely filled in by a depressed calcareous lamina; aperture large and nearly circular with a thickened annular rim; a small elliptical or pointed avicularium surmounting the zoœcia, and frequently one or two at the base.

M.C.; B.; M. Living Falkland and Kerguelen Islands.

Waters (Q.J.G.S.), 1887, p. 47) describes the oœcium as "widely open with a raised line arching across the front, a short distance above the opening, enclosing a narrow depressed area."

7. *A. cylindriforme*, Waters, sp. Pl. VI., fig. 2.

Membranipora cylindriforme, Waters, Q.J.G.S., 1831, p. 323; *id.*, 1882, p. 263.

Zoarium small, cylindrical. Zoœcia separated longitudinally by a small tract which may be considered an extension of the cell downwards; area broad below, narrowed above, triangular, with the angles rounded; lamina smooth or subgranular; aperture large, subcircular; four spines above, of which the lateral are considerably the larger; an avicularium, with pointed mandible, directed upwards or occasionally laterally, on a raised process at the apex of the zoœcium; another avicularium, with the mandible directed transversely, on an elevation below the area.

S.P.; M.C.; B.; M.; C.C. (W.).

8. *A. occultatum*, Waters, sp. Pl. V., fig. 15.

Membranipora occultata, Waters, Q.J.G.S., 1887, p. 48.

Zoarium encrusting. Zoœcia quadrate; aperture large, occupying about half the area, lower edge straight, arched above, sides straight or slightly contracted about the middle, granular; with age the sides and lower parts of the zoœcia elevated by a calcareous overgrowth, those of the contiguous zoœcia coalescing and becoming continuous so that the aperture appears to be deeply buried; a small rounded avicularium below or on one or both sides of the elevated portion.

B. Living. New Zealand.

I have no doubt this is the species so named by Waters, although my specimens differ from his description and figures in the slighter arching of the upper edge and the somewhat different form of the avicularia. The calcareous overgrowth gives it a very peculiar and characteristic appearance.

Lunulites, *Lamouroux*.

Zoarium usually more or less orbicular, convex on the anterior surface, plain or concave on the dorsal. Zoœcia elongated, with much raised, highly calcified, sloping, granular or crenulated margins; area partly filled in below and occasionally on the sides by a calcareous granular lamina, which slopes downwards from the margins. Vibracularia large, usually in special tracts between the zoœcial series, but occasionally situated at the summit of a zoœcium (Cupularia) or irregularly interspersed.

Lunulites, including Cupularia, and Selenaria are usually considered to constitute a distinct family, distinguished by the discoid or orbicular form of the zoarium, which also seems to be generally free and unattached, and by the presence of powerful vibracularia. The structure of the zoœcia, however, is so entirely membraniporidan that it seems to me they should be included in that family. This view has already been held by Gregory, Koschinsky and others. Busk has distinguished *Lunulites* by having the vibracularia in separate tracts between the zoœcial series, *Cupularia* by having a vibraculum at the summit of each zoœcium, and *Selenaria* by having some of the zoœcia, scattered irregularly among the others, of a different form and furnished with vibracula. In the present paper I distinguish the genera by the structure of the zoœcia, a division founded merely on the arrangement of the vibracula bringing together species structurally different and separating others in which the zoœcia are similar. Cupularia should, I think, be included in Lunulites.

1. *L. parvicella*, Tenison Woods, sp. Pl. VII., figs. 1, 2.

Selenaria parvicella, T. Woods, T.R.S.S.A., 1879, p. 10; Waters, Q.J.G.S., 1883, p. 441.

Zoarium nearly flat. Zoœcia in radiating lines, broad, distinct; margins granular, sloping downwards and inwards to the aperture, a large, granular sloping lamina below; aperture occupying about two-thirds of the area, narrower above, slightly contracted in the middle; vibracularian cells situated irregularly between the zoœcia, narrow pyriform, very long, the margins sloping and granular. Dorsal

surface with irregular flattened ridges separated by shallow furrows and having a row of round pores down the centre.

M.C.; L.B.; W.P. (W.)

In one specimen there are some smaller rounded cells, situated at the base of a zoœcium or vibracular cell, which probably also support vibracular.

2. *L. canaliculata*, n.sp. Pl. VII., fig. 3.

Zoarium discoid, slightly raised in the centre. Zoœcia in regular linear radiating series, with well marked wide vibracularian tracts between, elongated and somewhat quadrate; margins thick and granular; lower third of area filled in by a sloping granular lamina; aperture large, occupying two-thirds of the area, the lower edge straight; vibracularian tracts strongly granular, vibracular openings much elongated, narrow pyriform, the edges crenulated from the projecting granulations. Dorsal surface with regular linear ridges, with a row of pores along the centre, and separated by distinct sulci, the ridges alternately wider and narrower corresponding to the zoœcial and vibracular series.

L.B.

This species is closely allied to the last, of which it should perhaps be considerered a variety, the chief difference being that the vibracularian cells are arranged along distinct depressed tracts, which are also defined on the dorsal surface of the zoarium. The intercalated series of zoœcia seem always to commence with and form a continuation of a series of one or two vibracular cells.

3. *L. rutelta*, Tenison Woods. Pl. VII., fig. 4.

Lunulites (Cupularia) rutella, Tenison Woods, *l.c.*, p. 7.

Zoarium large, discoid, raised and conical at the centre. Zoœcia in bifurcating series radiating from the centre, mostly opposite, wider at the base; margins thick and granular; aperture occupying almost the whole area; on the internal sloping surface near the anterior extremity are two large pits or pores and posterior to these two or three other smaller round pores; vibracularian cells between the zoœcia and opposite their anterior extremities. Dorsal surface irregularly divided by broken radiating lines.

S.P.; B.R.; G.; L.B.

L. aperta, so far as I can judge from the figure and description, seems to be a worn state of the common form.

4. *L. biformis*, n.sp. Pl. XXII., fig. 13.

Zoarium circular, slightly raised in the centre. Zoœcia in regular radiating series, distinct, slightly raised distally; margins granular, sloping inwards at the sides; area in outer zoœcia entirely open, in the central zoœcia largely filled in by a depressed strongly granular calcareous lamina; vibracularian cells situated at the base of an intercalated series of zoœcia between two zoœcia of the contiguous rows, elongated, the opening rounded proximally and expanded distally, with a sharp process projecting inwards from one side. Dorsal surface concave, with radiating ridges, corresponding to the series of zoœcia, nodular and with large central pores, separated by narrow raised lines.

Cape Otway, Mr. Dennant.

I am indebted to Mr. Dennant for two perfect specimens of this fine species. In both, the marginal zoœcia have the same structure as those of the other species of the genus as here adopted. In all of those, however, occupying the central part of the zoarium the front is largely filled in by a granular calcareous layer formed by an overgrowth from the margins.

5. *? L. angulopora*, Tenison Woods. Pl. VIII., fig. 1.

? Lunulites angulopora, T. Woods, *l.c.*, p. 7

I have two small fragments, the position of which is very doubtful, but which may be referable to this species. The larger piece is that figured. It has portions of three rows of quadrate cells distinct throughout their whole thickness. On one aspect (the front) are seen two zoœcia, slightly depressed below the margins, the surface being finely granular. The aperture is broadly triangular or sub-trifoliate, the edges distinct and the lower part with a thickened rim; to one side are two rows of two narrow cells, each cell having a long linear opening down the centre, slightly enlarged below, and with distinct smooth margins. On the other (posterior) aspect, the cells are uniform in three rows, smooth and each having a large opening, wide and slightly arched above, contracting by straight sides to the junction of the middle and lower thirds, where there is on each side a sharp denticle below which the opening again contracts to form a bluntly angular sinus. These are probably avicularian.

Selenaria, *Busk*.

Zoarium more or less orbicular, convex on the frontal side, plane or concave on the dorsal which is usually radiately grooved. Zoœcia broad, expanded, arched above and usually contracted below; margins thin; lamina occupying greater part

of the area, depressed, slightly rising to the aperture. Vibracularia irregularly distributed or arranged in lines between the zoœcia.

In several of the species of this genus, the aperture is occasionally partly or wholly filled by a calcareous overgrowth which commences sometimes at the upper and sometimes at the lower edge.

1. *S. maculata*, Busk. Pl. VII., figs. 5, 6, 7.

Selenaria maculata, Busk, B.M.C., II., 101; Waters, Q.J.G.S., 1883, p. 440, Aug., 1885, p. 309; A.M.N.H., Sept., 1887, p. 201; *S. alata*, T. Woods, T.R.S.S.A., 1879, p. 11; Waters, Q.J.G.S., Aug., 1881, p. 345.

Zoarium discoid, elevated towards the centre. Zoœcia in more or less radiating lines, separated by prominent raised margins, broad, arched above, contracted below, concave and finely granular; aperture rounded above, the lower angles deeply incised so as to make the whole almost trifoliate; vibracular cells large, rounded, with distinct narrow margins, cribriform, encroaching on the zoarium above. Dorsal surface of zoarium with narrow, branched, radiating, raised lines, the spaces between the lines convex, granular and nodulated, and with numerous distinct pores.

S.P.; M.C.; Belm.; G.; L.B.; W.P. (W.). Recent Australia.

The markings on the posterior ridges vary a good deal. They are sometimes entirely granular and nodular, but there are usually numerous irregular pores; occasionally (fig. 7*a*) these pores are large, very numerous, closely crowded and occupying the whole surface.

2. *S. punctata*, Tenison Woods. Pl. VII., figs. 8, 9.

Selenaria punctata, T. Woods, *l.c.*, p. 9; Waters, Q.J.G.S., Aug., 1883, p. 440; A.M.N.H., Sept., 1887, p. 201; *S. fenestrata*, Haswell, Pr. Linn. Soc. N.S.W., 1880, p. 42.

Zoarium discoid, convex. Zoœcia in irregularly radiating series, rounded, wider above, lamina finely granular, inferior and lateral parts depressed, rising to the aperture below which on each side is a large stellate pore; aperture large, rounded above, straight or slightly hollowed below; vibracular cells large, with a distinct margin, cribriform. Posterior surface of zoarium with radiating convex ridges, with large round pores, and separated by deep furrows at the bottom of which are narrow raised lines.

M.C.; L.B.; W.P. (W.) Recent New South Wales.

Differs from *S. maculata*, to which it is closely allied, in the large size of the zoœcia and the two stellate pores below the aperture.

3. *S. squamosa*, n.sp. Pl. VII., figs. 10, 11, 12.

Selenaria marginata, Waters, Q.J.G.S., Aug. 1881, p. 344; *Lunulites initia*, Waters, Q.J.G.S., Aug., 1883, p. 442.

Zoarium small, discoid, slightly convex. Zoœcia rounded or ovate, the margins thin, raised, sometimes slightly overlapping the zoœcium beyond; lamina finely granular, depressed inferiorly; aperture lofty, arched above, hollowed below; vibracular cells small, irregularly placed among the zoœcia, elliptical, cribriform. Dorsal surface divided in an irregularly radiating manner by grooves, between which the surface is convex but not pitted or porous.

Var. *lucens*. Vibracular cells finely porous or punctate. Dorsal surface with irregularly radiating and branched grooves, the intervening elevations smooth, shining and glassy.

S.P.; M.C.; Bel.; C.C. (W.) Living. Australia.

Var. *pulchella*, Pl. VII., fig. 13. Zoœcia broad, rounded or lunate, very little or not at all overlapping; margins thin; lamina finely granular; aperture lofty, wider above, contracted below, the lower edge slightly convex and the angles slightly incised; vibracular cells about half the size of the zoœcia, with a thin margin and finely perforated surface. Dorsal surface of zoarium with radiating, dichotomously divided raised lines, the intervening broad ridges granular and with a few pores.

Bel.

I was at first inclined to refer this species to T. Woods' *S. marginata*, as has been done by Waters, but the description given by Woods disagrees with it in several particulars and is so imperfect as to make the identification exceedingly doubtful. Under these circumstances I think it advisable to give the present species a different name.

The vibracular cells vary a good deal. They are occasionally very small, pointed, and with one to three or four seriated pores. These occur not only at the growing edges of the zoarium, but in some specimens also scattered among the internal zoœcia. They are usually about half the size of the zoœcia, irregularly shaped, with a thin border and the surface finely cribriform. In var. *lucens* the pores on the vibracularia are very minute, and the surface may be only finely punctate.

4. *S. concinna*, Tenison Woods. Pl. VII., fig. 15.

Selenaria concinna, T. Woods, *l.c.*, p. 10; Waters, A.M.N.H., Sept., 1887.

Zoarium discoid, raised in the centre, concave posteriorly. Zoœcia arranged in radiating lines, lunate or semicircular, not overlapping; margins thin, crenulated;

lamina finely granular; aperture higher than wide, the sides nearly straight, lower edge nearly straight or slightly hollowed; vibracular cells narrow, elongated, raised, a narrow slit with serrated edges in the centre closed towards the extremity, vibracular pit large encroaching on the zoœcium in front. Dorsal surface with narrow, raised, radiating, dichotomously divided lines, the intervening spaces nodular or granular with irregular or round pores.

M.C.; G.; L.B. Living. Port Jackson.

At once distinguished by the well marked characteristic vibracularia. I am not quite sure that Waters' species is the same, as the vibracularium has not quite the same appearance.

5. *S. cupola*, Tenison Woods, sp. Pl. VII., fig. 14.

Lunulites cupola, T. Woods, *l.c.*, p. 8; *L. petaloides* (D'Orbigny) Waters, Q.J.G.S., 1883, p. 442.

Zoarium circular, subconical. Zoœcia in irregular radiating series with deep vibracular channels between, rounded and wide anteriorly and narrower behind; margins raised and crenulated; lamina finely granular, rising from the depression within the margins to the aperture; aperture arched above and contracted towards the straight lower edge; vibracular cells rather small, with an opening contracted in the middle by a process from each side, the lower edge minutely denticulate. Dorsal surface concave, with irregular slightly prominent ridges separated by distinct narrow sulci.

S.P.; M.C.; C.B.; Bel.; Birregurra; L.B.

Very closely allied to D'Orbigny's *Lunulites petaloides* with which Waters considers it identical. D.Orbigny describes and figures the zoœcia as distinct behind, which they are not in our species. I, therefore, consider it advisable to take the name given by Woods.

It is readily distinguished by the regular arrangement of the zoœcial series and the characteristic vibracularia situated between them.

Farcimia, *Pourtales.*

Zoarium calcareous, erect, branching; stems and branches composed of segments united by corneous joints. Zoœcia arranged round an imaginary axis, with elevated margins and depressed area which is more or less covered in with membrane. *Hincks.*

1. *F. lusoria*, Waters. Pl. VI., fig. 4.

Membranipora lusoria, Waters, Q.J.G.S., 1881, p. 324; 1883, p. 434.

Zoœcia alternate in four or more longitudinal series, elongated; margins sharply raised, smooth; aperture occupying about half the area, expanded and rounded above, rounded below, narrower at the middle; lamina calcareous, smooth Avicularia large, elevated, sessile at the base of a zoœcium, opening upwards.

S.P.; M.C.; B.; B.R.

The avicularia more resemble those of Menipea and Scrupocellaria than those usually found in the Membraniporidæ.

2. *F. articulata*, Waters. Pl. VI., fig. 5.

Membranipora articulata, Waters, Q.J.G.S., 1882, p. 264; *Farcimia appendiculata*, Hincks, A.M.N.H., March, 1883; McG., P.Z.V., 178.

Branches divided into distinct, articulated internodes. Zoœcia quadriserial, elongated, surrounded by a raised smooth margin, somewhat pointed above and angular below, the sides being straight; lamina smooth, narrow on the sides and filling the lower fifth; aperture rounded above, slightly contracted and straight below. A small avicularium on each side opposite the top of the aperture, supported on a thick raised base extending obliquely on the side of the zoœcium. At an articulation the internodes connected by two tubes from opposite series of zoœcia, between which the intermediate series are intercalated.

M.C.; W.P. (W.). Living. Australia.

In recent specimens the zoœcia are broader and the sides not so straight. For a full description of recent specimens, including that of the peculiar avicularia, I may refer to those of Hincks (A.M.N.H.) and the P.Z.V. The identity of the recent and fossil forms, already pointed out by Waters in a paper on the fossil cheilostomata of New Zealand, would scarcely be recognised without calcining the former.

F. oculata, Busk, s.p. Pl. VI., fig. 6, 7.

Nellia oculata, Busk, B.M.C., Pt. I., p. 18; C.P., Pt. I., p. 27; Smith, F.B., Pt. II., p. 3; McG., P.Z.V., 51; *Membranipora oculata*, Waters, Q.J.G.S., 1883, p. 434.

Branches very slender, articulated. Zoœcia quadriserial, elongated, the upper part projecting forwards; aperture occupying almost the whole area, the margins of which are thickened and slope inwards; at the base of the zoœcia one or two pairs of

small avicularia supported on papilliform elevations. Oœcium above the aperture, semicircular, depressed, with a thickened rim.

M.C.; W.P. (W.). Living. Australia and Florida.

Calescharа, *McG.*

Zoarium encrusting, or erect and uni- or bilaminate. Zoœcia separated by distinct raised calcareous margins; front covered by a thick epitheca, beneath which the calcareous front wall is bevelled to the depressed centre; on each side of the calcareous front is a longitudinal fissure, and across the upper part a thickened bar, leaving a membranous portion above containing the thyrostome, the operculum of which is incomplete. Oœcia altered and expanded zoœcia.

1. *C. denticulata*, McG. Pl. VI., figs. 8, 9.

C. denticulata, McG. in P.Z.V. 48; Busk, C.P., Pt. I., p. 77; *Membranipora denticulata*, Hincks, A.M.N.H., February, 1881.

Characters those of the genus. Lamina granular; lateral fissures denticulate; aperture occupying rather less than one-fourth of the area.

S.P.; M.C.; C.B.; W.P. A common living Australian species.

In the fossils of course only the deeper calcareous front wall is seen. The calcareous part between the fissures and the thickened cross-bar are usually worn away, when the Zoœcia have a very different appearance, seeming to have a large nearly elliptical aperture. In some specimens, however, these parts are well preserved, and perfect and worn zoœcia may be seen in the same fragment.

Of the systematic position of this curious form, opinions may, as Mr. Busk remarks, well be divided. Young recent zoœcia have the structure of Membranipora, but with age the deeper calcareous wall with its lateral fissures and cross-bar becomes developed; Hincks at first included it in the genus Membranipora, but subsequently (A.M.N.H., July, 1887) adopts the genus Calescharа and places it in the Steganoporellidæ. On the whole I consider its affinities are more with the Membraniporidæ in which I include the genus, although I am by no means satisfied that Hincks' view may not be the correct one.

Family Steganoporellidæ.

Zoarium expanded and crustaceous, or free and uni- or bilaminate, or erect and cylindrical. Zoœcia separated by thick calcareous margins, divided into two chambers, an upper closed by a thick epitheca which carries the operculum, and a

lower separated by a usually perforated calcareous lamina with a large variously shaped opening (opesia) at the anterior end and containing the polypide.

Thalamoporella, *Hincks.*

Zoœcia with the anterior extremity of the calcareous lamina separating the two chambers, having a narrow calcareous wall carried up to a level with the margin of the cell to which it is united, forming an orifice which is partly closed by the operculum; on each side of it a large foramen. Oœcia external.

1. *T. lata*, n.sp. Pl. VI., fig. 11.

Zoœcia short and broad, lamina with numerous white-bordered pores and with, anteriorly, a large foramen on each side; opesia arched above, straight below; a radially grooved hollow mamilliform process on each side of the opesia.

S.P.

A well marked species of which I have only seen the small fragment figured. The mamilliform processes are strikingly similar to those found in Diploporella and Thairapora.

2. *T. rozieri*, Audoin, sp. Pl. VI., fig. 10.

Membranipora Rozieri, Busk, B.M.C. Pt. II., 59; *Steginoporella Rozieri*, Smitt, F.B. Pt. II., 16; Thalamoporella, *id.* Hincks, A.M.N.H., February, 1887; Waters, Q.J.G.S. 1882, p. 505; A.M.N.H. September, 1887.

Zoœcia elongated; opesia arched above, hollowed below; surface granular with a large oblique oval opening on either side below the opesia.

M.C.; M. Living. Florida, South America, Australia, New Zealand, etc.

The typical *T. rozieri* has a small tuberosity on each side of the opesia. This is very obscurely seen in the figured specimen, but is wanting in the others, in which respect the present form would agree with that described by Hincks (A.M.N.H.) as var. *Indica.* None of my specimens have avicularia or zoœcia. The oœcium in recent specimens is described by Busk as globose, carinate in front.

Steganoporella, *Smitt.*

Zoœcia with the aboral compartment divided into two chambers by a diaphragm, the lower of which is connected by a tubular passage with the upper and contains the polypide; the whole of the upper part of the cell forming a large cavity, closed in by the operculum and membranous front wall. Operculum very large. External oœcia wanting, represented by an internal chamber.

1. *S. magnilabris*, Busk. Pl. VI., figs. 14, 15, 16.

Membranipora magnilabris, Busk, B.M.C. Pt. II., 62; Steganoporella, *id.* Busk, C.P., Pt. I., 75; *Steganoporella elegans*, Smitt, F.B., Pt. II., 15; *Steganoporella magnilabris*, McG., P.Z.V., 43; Hincks, A.M.N.H., February, 1887; Waters, Q.J.G.S.

Zoarium expanded, encrusting or decumbent, or bilaminate and more erect, or cylindrical. Zoœcia separated by thick raised margins higher anteriorly, quadrate or rounded above; lamina (separating the superficial and deep chambers in recent specimens) much depressed anteriorly, closely perforated; opesia large, occupying about half the front of the zoœcium, semicircular; a quadrate calcareous plate rising from the edge of the opesia and connected above with the tubular opening for the polypide, and having a squared depression or opening.

S.P.; M.C.; B.; C.B.; M. A common recent Australian and New Zealand species; occurring also in Florida, Japan, and South Africa.

The fossils differ in some respects from the usual living form. The anterior extremities are mostly rounded, not quadrate; the opesia in the ordinary zoœcia extend quite to the thickened margin above, while in the recent there is a narrow, smooth, calcareous plate or shelf; the larger (ovicelligerous) zoœcia are squared above, and the calcareous lamina occupying the upper part of the opesia is excavated so that the the opesia is nearly triangular. In some specimens the zoœcia are much narrower and the shelf on the upper edge of the opesia is distinct as in the recent. In the unilaminate specimens posteriorly the zoœcia are distinct, quadrate, convex, and smooth. In one (fig. 143) they are separated by raised margins, and many have a conical hollow process, probably a modified radical tube. I am not sure that the specimen shown in fig. 15, of which I have only a fragment, but which seems to have been cylindrical, does not belong to the closely allied *S. neozelanica* (Busk).

2. *S. depressa*, n.sp. Pl. VI., fig. 17.

Zoœcia indistinct, with broad flat confluent margins; area broadly elliptical; lamina much depressed, with numerous close-set pores; opesia usually semicircular; a plate rising from the anterior edge of the lamina to the level of the margins, with a large perforation in the centre and a smaller rounded one on each side.

M.

3. *S. lateralis*, n.sp. Pl. VI., fig. 18.

Zoœcia arranged alternately in linear series, large quadrate margins, finely granular; lamina moderately depressed, finely granular; opesia occupying a third

or a fourth part of the area, with the tubular opening for the polypide situated to one side.

M.C.

This species is readily distinguished by the long nearly tubular polypide opening being situated to one side. At the bottom of the opesia, in front of the tubular orifice, are two rounded openings, possibly communication pores. The specimens are all in a single layer, but have probably been bilaminate.

4. *S. patula*, Waters, Pl. VI., figs. 19, 20.

Micropora patula, Waters, Q.J.G.S., 1881, p. 326; *Steganoporella patula*, *l.c.*, 1882, p. 265.

Zoarium broadly ligulate, bilaminate. Zoœcia in regular linear series, much elongated, quadrate, the lateral margins distinct and crenulate; lamina depressed anteriorly, finely granular and perforated; opesia occupying about a fifth of the area, having on the sides and above a thick beaded rim strongly projecting above and cucullate; from the inferior edge of the opesia a smooth calcareous plate curving forwards and backwards and with a small round opening on each side. Oœcia taking the place of zoœcia, broad, flat, granular on the surface and opening into the zoœcium below. Avicularia on special tracts encroaching on the base of one zoœcium at a bifurcation, and on the corresponding side of the preceding zoœcium in the series.

S.P.; M.C.

In the specimen from which figure 20 is taken there are three oœcia. One is similar to that figured, and another is mitriform.

Family Microporidæ.

Zoarium encrusting, or erect and uni- or bilaminate. Zoœcia with distinct, raised margins; front depressed, calcareous, usually covered by a thick epitheca; operculum complete.

Macropora, *n.g*

Zoarium unilaminate and encrusting or bilaminate. Zoœcia large, broad, front entirely calcareous; thyrostome raised, semicircular or nearly so, not reaching the margins; peristome thickened.

I propose this genus for the reception of two species, which it seems to me ought to be included in the Microporidæ. It differs from Micropora in the thicker calcareous front wall and the thickened raised peristome. Waters includes

M. Clarkei in Monoporella, a genus to which, as originally defined by Hincks (A.M.N.H., July, 1881) it certainly does not belong.

1. *M. centralis*, n.sp. Pl. VIII., fig. 3.

Zoœcia broad, hexagonal, with narrow, finely granular raised margins; surface slightly convex, silvery and very finely granular, with interspersed small, scattered, usually bordered pores; thyrostome in the upper third but at a considerable distance from the anterior extremity of the zoœcium, large, arched above, straight below, slightly contracted towards the base and forming rather more than a semicircle; peristome thickened and raised.

M.C.

A beautiful and distinct species.

2. *M. clarkei*, Tenison Woods, sp. Pl. VIII., figs. 5, 6.

Eschara clarkei, Tenison Woods, T.R.S.N.S.W., 1876, p. 2; *Monoporella sexangularis*, Waters, Q.J.G.S., 1883, p. 43; *id.* 1885, p. 291.

Zoarium large, flat, bilaminate and lobed, or foliaceous, with large, distant fenestræ. Zoœcia hexagonal, distinct, with much-raised margins, the surface depressed and hollowed but rising to the thyrostome, finely granular; thyrostome large, raised, arched above, straight or slightly hollowed below, situated close to the upper extremity of the zoœcium, with a thick, raised peristome.

M.C.; B.R.; W.P.; M.; Batesford.

Waters refers this to the *Eschara sexangularis* of Goldfuss and Hagenow, and he may be right; but as there is some doubt I have retained Tenison Woods' specific name, the species indicated by him being clearly identical with that here described. The size of the thyrostome varies somewhat. Waters has found zoœcial avicularia in an Aldinga specimen. They must, however, be very rare, as they do not occur in any of the numerous specimens I have examined.

Family Cribrilinidæ.

Zoarium encrusting or erect. Zoœcia contiguous or disjunct; front wall formed by a series of ribs, constituted by modified marginal spines converging to a median line, the intervening fissures remaining open, or forming grooves, or closed at intervals by calcareous cross-bars so as to form perforated furrows.

The essential character of this very natural family is that the front wall is formed by the development and overarching of series of marginal spines which meet and coalesce in the centre. The fissures between the ribs so formed may remain

permanently open, or become closed throughout the whole extent, their situation being still marked by a suture or groove, or they may be closed at intervals by calcareous cross-bars or trabeculæ leaving regular series of openings or pores.

Membraniporella, *Smitt.*

Zoarium encrusting or foliaceous. Zoœcia contiguous or disjunct; closed in front by a series of more or less consolidated calcareous ribs.

1. *M. distans*, McG.

Membraniporella distans, McG., P.Z.V., 187.

Two single damaged zoœcia from Muddy Creek belong either to *M. distans* or the well-known closely allied European *M. nitida*. The specimens are not sufficient, especially in the absence of oœcia, for satisfactory identification, but as *M. nitida* has not, so far as I know, been found living in Australia, I refer them to the recent Victorian species.

2. *M. tennicosta*, n.sp. Pl. VIII., figs. 15, 16.

Zoœcia ovate, distinct, separated by narrow grooves; outer part of anterior surface smooth, middle part raised and formed by a series of 8-16 narrow ribs on each side ending in a narrow central ridge, the intervening fissures remaining open or partly or wholly filled in by a thin calcareous extension from the ribs; thyrostome large, wider and slightly arched above, lower lip slightly hollowed and with a prominent denticle on each side; thyrostome of ovicelligerous cells wide, nearly semicircular, the lower lip straight or very slightly hollowed and without denticles. Oœcia large, prominent, rounded, a vertical raised rib with a depression on each side extending nearly the whole length.

S.P.; M.C.

The furrows between the ribs are in most of the zoœcia filled in by a thin calcareous membrane along the centre of which is a partial or complete slit-like fissure which is frequently closed, its situation being then usually indicated by a faint line. This species differs from the others of the genus in the exceeding narrowness of the ribs and the more complete denticulate thyrostome. Except for the absence of the trabeculæ between the ribs and their great tennity, it bears a considerable resemblance to *Cribrilina orbicula*. I am not quite satisfied that it ought not to be referred to Cribrilina, as I have an imperfect specimen, which may belong to the same species, in which the margin, although narrower, is smooth, the front a little broader, the ribs thicker and joined by regular small trabeculæ and the thyrostome of nearly the same structure but not so widened above. At the

same time I have a single zoœcium, which is undoubtedly *M. tenuicosta*, in which the ribs are much more highly calcified and thicker and separated by distinct fissures throughout their whole length.

Cribrilina, *Gray.*

Front of zoœcia formed by the partial coalescence of marginal spines or ribs, the intervening spaces depressed and occupied by a series of pores or perforations, or more completely filled in so that the prominence of the ribs disappears, and the front is occupied by radiating or concentric series of pores.

Cribrilina differs from Membraniporella in having the ribs united by cross growths of calcareous matter, leaving numerous pores. The genus ought to be restricted to those species in which the pores, from being arranged in regular radiating or concentric series, show that they are formed by the partial junction of the transverse ribs. Species in which the anterior pores are simply spaces left in a general calcareous ingrowth from the margins of the zoœcia ought clearly to be referred to genera of other families.

1. *C. orbicula*, n.sp. Pl. VIII., fig. 17.

Zoœcia wide, somewhat hexagonal, distinct; outer part smooth, the middle slightly raised, rounded, closed by about eighteen narrow ribs on each side, the intervening furrows crossed by small trabeculæ leaving regular concentric series of minute linear pores; thyrostome wide, arched above, slightly narrowed below and with an obscure denticle at each angle.

M.C.

This very beautiful species is at once distinguished by the broad, smooth margin of the zoœcia, the number of the narrow costæ and the regular concentric linear pores in the intervening furrows.

2. *C. suggerens*, Waters. Pl. VIII., fig. 8.

Cribrilina suggerens, Waters, Q.J.G.S., 1881, p. 327.

Zoarium very small, rarely encrusting, almost always bilaminate. Zoœcia ovate, raised, flat or depressed towards the centre; about six or eight rows of short, nearly vertical, open tubes on slightly raised ridges, diverging on each side from the median line, and arranged so as to form also concentric series. In the furrows between the rows of tubes numerous distinct round pores alternating with the tubes; thyrostome small, semicircular.

S.P.; M.C.; B.; C.C. (W.)

A very small species. Outside the raised tubuliferous portion of the zoœcium there is a narrow, smooth rim. The tubes of the outer rows are considerably more elevated, and are sometimes pointed so as to resemble inverted funnels. There are frequently several small tubes above the thyrostome, and occasionally on the smooth marginal portion of the zoœcium. Waters describes a short triangular avicularium as occasionally situated above the thyrostome on one side. It is very closely allied to *C. tubulifera*, described by Hincks from Port Jackson (A.M.N.H., July, 1881), in which, however, the thyrostome is much larger. Waters records *C. tubulifera* from Muddy Creek, but it does not occur among my specimens.

3. *C. radiata*, Moll. sp. Pl. VIII., fig. 9.

Cribrilina radiata, Hincks, B.M.P., 185; Waters, Q.J.G.S., 1882, p. 265; *id.*, 1885, p. 292; McG., P.Z.V., 187. A full list of the many synonyms of this species will be found in Hincks' B.M.P. and Miss Jelly's Catalogue.

Zoœcium encrusting. Zoœcia ovate, a series of 7-12 ridges on each side, with intervening perforated grooves, radiating from a median elevated line; thyrostome rather shallow, arched above, straight below, usually with several spines on the upper margin; a round pore, sometimes absent, below the lower lip, frequently situated in a separate triangular area; a few scattered avicularia among the zoœcia, with long, narrow, pointed mandibles. Oœcia galeate or globose, with a vertical or oblique keel.

S.P.; M.C. A common cosmopolitan species.

4. *C. cornuta*, n.sp. Pl. VIII., figs. 10, 11, 12.

Zoœcia distinct, ovate or subrotund, irregularly arranged, very convex; ten or twelve ridges on each side radiating from the centre, which has no distinct median line, the intervening grooves with large pores; thyrostome lofty, arched and expanded above, straight below; peristome raised on the sides and above, with a stout, pointed process at its lower part on either side, directed upwards and forwards; an avicularium (usually absent), with a broad obtuse or rounded mandible, projecting from the summit of the zoœcium.

S.P., M.C., C.B., G.

The specimens are all small, and most are portions of cylindrical branches. In some specimens the oral processes are not very distinct, and the avicularia exist only on a few of the zoœcia. The ridges are occasionally very prominent, the lower edge of the thyrostome (formed by first rib) being then very thick and conspicuous.

5. *C. terminata*, Waters. Pl. VIII., figs. 13, 14.

Cribrilina terminata, Waters, Q.J.G.S., 1881, p. 326; 1882, p. 507.

Zoarium encrusting, or erect and uni- or bilaminate, or cylindrical. Zoœcia confluent, the margins smooth and usually raised; surface convex, with numerous large round pores (with a minute denticle on the inner edge) arranged concentrically and obscurely radiately; thyrostome straight below, arched above and nearly semicircular; several small rounded avicularia round the thyrostome, usually one or two above and one or two in the neighbourhood of the angles below; occasionally other vicarious avicularia, with long triangular mandibles, between the zoœcia. Oœcia subimmersed, smooth, with a large pore (probably avicularian) on each side.

S.P.; M.C.; B.; C.B.; W.P.; L.B.; C.C. (W.)

In the fertile zoœcia, the upper margin of the peristome is a broad crenulated band, the opening of the oœcium seeming to be above it.

The small specimen shewn in fig. 14, which I was at first inclined to regard as a distinct species, I believe to be a younger state of the same, or at all events only a variety. The zoœcia are nearly circular, the pores smaller and arranged in very regular radiating grooves.

6. *C. dentipora*, Waters. Pl. VIII., fig. 18.

Cribrilina dentipora, Waters, Q.J.G.S., 1881, p. 326.

Zoarium filiform, erect. Zoœcia on one side only, in single series, each arising from the upper part of the zoœcium below and to one side, directed obliquely upwards and outwards and springing alternately from opposite sides, so that the series is zigzag; numerous pores, with a small sharp denticle on the inner side, arranged in concentric series; thyrostome nearly straight below, expanded and arched above; one or two large spines above; an elliptical avicularium on each side of the base of the thyrostome. Dorsal surface of zoarium with a sinuous depression following the direction of the zoœcia.

S.P.; M.C.; M.; C.C. (W.)

7. *C. elevata*, n.sp. Pl. VIII., fig. 19.

Zoarium very small, nearly spherical, with zoœcia on the whole surface, and probably free. Zoœcia nearly circular, with a series of 8-10 short, thick, widely separated ribs, rising abruptly and curved inwards to a thick plate, having round its margin a concentric row of round pores and several others irregularly placed within these, the anterior edge of the plate being straight; thyrostome subcircular, with a sinus below, sloping backwards from the edge of the plate; an avicularium

at the summit of the thyrostome, raised anteriorly and with the blunt mandible directed forwards.

S.P.

The zoarium is small and seemingly free. The central elevated plate is evidently formed by the fusion and extension of the marginal ribs. It agrees with *Corbulipora ornata* in the central plate and stout marginal ribs, but otherwise differs in the structure of the zoœcium, and I think there can be no doubt that its proper place is in Cribrilina.

Corbulipora, *n.g.*

Zoarium erect. Zoœcia quadriserial, facing to the four sides, much elongated, calcareous, readily separating longitudinally, anterior part wider, raised, formed by a series of vertical ribs on each side, turning abruptly inwards and uniting to form a flat plate; posterior part of zoœcia narrow, smooth and entire; thyrostome with the upper lip arched, thickened and smooth.

1. *C. ornata*, n.sp. Pl. VIII., figs. 20, 21.

Characters as for the genus. The number of ribs is 8-10 on each side, and at the angle of each, where it becomes incorporated in the horizontal plate is a small cylindrical protuberance. The oœcium is shallow, cucullate, arching over the thyrostome.

S.P.; M.C.

This species resembles *Cribrilina elevata* in having a central elevated plate supported on vertical marginal ribs. It differs from the other Cribrilinidæ in having the zoœcia much elongated and readily separable laterally, although firmly united at the ends, as well as in their smooth extension below the part closed by the marginal ribs and plate. It cannot, I think, be properly included in either Membraniporella or Cribrilina, and I have therefore constituted a new genus for its reception.

Family Hiantoporidæ.

Zoarium unilaminate, encrusting or loosely adnate, or erect and bilaminate. Zoœcia at first membraniporidan, the front subsequently closed in by a perforated plate formed by the growth from the margins of a series of branching calcareous processes, the extremities of which coalesce, leaving large foramina; the lower margin of the thyrostome thus formed thickened and entire or raised into a usually aviculiferous mucro. Dorsal surface of zoœcia convex in the unilaminate forms, with numerous calcareous or corneous radical tubes for attachment to the object over which the zoarium grows.

This family group has already been suggested by Hincks (A.M.N.H., December, 1891) in a valuable criticism on *Cribrilina monoceros* and *Hiantopora ferox*, in which he points out the relationship of these two species and the real developmental structure of the perforated front wall. Jullien (Cap Horn Bryozoaires, p. 62) places *C. monoceros* under a distinct genus—*Arachnopusia*—of which he makes a separate family. The characters on which he founds both family and genus are, as Hincks remarks, only of secondary importance, and at the most of merely specific value.

H. monoceros differs from *H. ferox* in having the zoœcia in their early membraniporidan state closely united and not disjunct and joined by communicating tubes as in the last named species and probably in *H. halli*. This junction of the early zoœcia by membranous tubes is similar to the arrangement in many species of Beania (Diachoris) and several species of membranipora, and the attachment by posterior radical tubes shews a farther alliance to *M. radicifera*.

Hiantopora, *McG.*

Characters as for the family.

1. *H. halli*, n.sp. Pl. VIII., fig. 25.

Zoœcia indistinct, alternate, very deep; front wall covered by a calcareous plate with large elliptical or ovate perforations, the anterior edge being entire, sharply turned forwards, and surmounted by a pair of slight eminences with small depressions (seemingly avicularian) on their summits; the base of the zoœcium behind the perforated plate, smooth, with a transverse reniform pore, from which descends a short, sharp ridge; a large raised avicularium, with long mandible, extending outwards from each side opposite the reniform pore to the elevation of the retiform plate of the contiguous zoœcium; anterior part of the zoœcium much depressed; thyrostome having a minute avicularium above its straight upper edge, and a stout rigid calcareous spine on each side. Oœcium mitriform, immersed. Dorsally the inferior portion of the zoœcium much projecting, with numerous small conical elevations, ending in calcareous radical tubes.

M.C.

Unfortunately the only specimen I have seen does not show the zoœcial growth satisfactorily, the marginal zoœcia being well calcified. So far as I can make out, the inferior reniform pore is formed by the junction of a small plate from each margin; from the upper of these plates two or three processes grow forwards and anastomose to form the perforated front wall; the elevated anterior bar seems to be constituted by a growth from the bases of the avicularia of the contiguous zoœcia.

I have little doubt that the zoœcia are at first united by connecting tubes as in the Diachoridan form of Beania and *Membranipora radicifera*.

I have much pleasure in associating with this interesting species the name of Mr. T. S. Hall, well known for his geological researches, to whom I am indebted for many valuable contributions.

2. *H. monoceros*, Busk, sp. Pl. VIII., fig. 22.

Lepralia monoceros, Busk, B.M.C., Pt. I., p. 72; *id.*, C.P., Pt. I., p. 133; MeG., P.Z.V., 35; *Cribrilina monoceros*, Hincks, A.M.N.H., July, 1881; *id.*, Oct., 1884; *id.*, Dec., 1891; MeG., P.Z.V., 187; Waters, Q.J.G.S., 1882, p. 507; *Arachnopusia monoceros*, Jullien, Cap Horn Bryozoaires, p. 62.

Zoœcia indistinct, with numerous large pores; thyrostome arched above, lower margin straight, or with a central pointed mucro; a round pore, marking the articulation of a spine, at one angle within the peristome.

M.C.; B.(W.) A common living Australian and New Zealand species.

The specimens are in a very imperfect state, but there is no doubt of the identification. For description of recent specimens see P.Z.V. To this I may add that in a very perfect specimen the posterior surface of the zoœcia, as seen through the fenestræ of a Retepore in which it grows, are furnished with distinct calcareous radical tubes.

3. *H. magna*, n.sp. Pl. VIII., fig. 23. P.Z.V. fig. 27

Zoœcia large, broadly ovate, separated by narrow, raised margins; surface with numerous large, round pores; thyrostome wide and lofty, arched above, lower margin straight, with a slight mucro in the centre. Dorsally the zoœcia are obscurely hexagonal, with thin perforated raised margins, the surface smooth.

The separate margins seen posteriorly may possibly be the bases of another layer of zoœcia, the zoarium being really bilaminate.

M.C.

I refer this species very doubtfully to the present genus.

4. *H. liversidgei*, Tenison Woods, sp. Pl. IX., figs. 21, 22.

Eschara liversidgei, Tenison Woods, T.R.S.N.S.W., 1876, p. 149; *Micropora ferrea*, Waters, Q.J.G.S., 1881, p. 330; var. porosa, *l.c.*, 1882, p. 267; *Mucronella mucronata*, Waters, *l.c.*, 1881, p. 328.

Zoarium bilaminate, branched. Zoœcia indistinct, surface irregular; usually 3-5, occasionally one or two, pores of varying size, and mostly having a small, simple

serrated or fimbriated denticle on one side; thyrostome large, deep, widely arched above, contracted below, the lower edge straight or mostly developing a broad mucro, which may be smooth or serrated on the edge, frequently a small serrated denticle on each side internally, and occasionally one from the upper lip; zoœcium raised round the thyrostome and having a variable number of small, round avicularian pores on small mamilliform or tubular elevations; small elliptical or rounded avicularia irregularly scattered over the surface of the zoarium; on the edge of the branches, at the junction of the laminæ, a series of large projecting avicularia, with strong down-curved mucro, and the mandible opening downwards. Oœcia very rare, small, deeply immersed.

S.P.; M.C.; B.; C.B.; C.C. (W.)

The appearance varies very much, according to the amount of calcification and number and size of the pores. The pores are usually 3-5 in number, of very variable size. In one form, of which I have several specimens, the zoarium is highly calcified, the thyrostome very large and deep, and there are a single, or occasionally two, large pores and numerous small elevated pores, most of which, if not all, are avicularian. I was at first very doubtful of the systematic position of this species, but the examination of specimens in which the growth of the zoœcia can be traced shews clearly that it belongs to Hiantopora, as here defined. The first appearance of the zoœcium is membraniporidan, with a large elliptical aperture occupying the whole front, except a small portion inferiorly. The margins become thickened, and the aperture is contracted by two calcareous ingrowths on each side, which gradually extend inwards until they meet and coalesce. The upper bar forming the lower lips of the thyrostome is generally the first to be completed; from these bars other processes are developed to form the pores and the oval mucro. As calcification advances the large pores become contracted or divided, some of the smaller divisions frequently being obliterated. There are rarely fewer than three permanent pores left, although occasionally there is only one of large size; and generally on one margin, usually the inner or lower, a denticle remains. The mucronate process of the lower edge of the thyrostome is often not median but developed to one side. Small serrated or fimbriated processes or denticles of varying width are also found on its sides, or occasionally on the upper part. Small avicularia are early developed on the margins of the zoœcia before calcification is far advanced.

There is no doubt of its identity with *Eschara liversidgei* of T. Woods, and I have therefore retained his specific name, although his description is very meagre and unsatisfactory.

Family Microporellidæ.

Zoarium encrusting or erect and uni- or bilaminate. Zoœcia horizontal, calcareous and destitute of membranous area; front with a single pore or perforated plate or with several pores opening into the perivisceral cavity; thyrostome arched above, entire below. Oœcia prominent and external, or modified zoœcia.

The essential character of this family is the presence of one or more pores opening directly into the cavity of the zoœcium. Two groups, differing in several points, but agreeing in the cardinal one of the zoœcial pore, are included. In the one, containing of those here described, *Microporella* and *Tessaradonia*, the oœcia are of the usual marsupial form, and external. The other, of which *Adeona* (including *Adeonellopsis*) is the only genus, differs chiefly in the oœcia not being external and distinct, but being internal and consisting of modified zoœcia (*gonœcia* of Hincks.) It also differs in having, in addition to ordinary sessile avicularia, other larger avicularia developed in special cells variously distributed among the zoœcia. These characters, however, although important and very interesting, can scarcely be considered of sufficient value to distinguish a separate family. The genus *Adeonella* of Busk agrees with Adeona in having gonœcia and vicarious avicularia, but differs in having the pore on the anterior surface, when present, formed by a process from each side of the lower lips uniting to form an arch beneath, which it opens into the peristomial chamber in front of the true thyrostome. In the only species which I have found fossil there is no pore, but other specimens may probably show it. I have referred Adeonella to the Schizoporellidæ, to which this species seems to belong, as do also *A.* (*Eschara*) *dispar* (McG.) and *A. platalea* (Busk), as well as several others, at least of the Challenger species.*

Microporella, *Gray*.

Thyrostome arched above, straight below; a single circular or lunate pore (*trypa* of Gregory), or a perforated plate below the lower lip. Oœcia external.

1. *M. ciliata*, Linn, sp. Pl. IX., fig. 3.

Lepralia ciliata, Busk, B.M.C., Pt. II., 73; *id.*, Crag Pol., 42; McG., P.Z.V., 37; *Microporella ciliata*, Hincks, B.M.P., 206; Busk, C.P., Pt. I., 138; Waters, Q.J.G.S., 1882, p. 266 and 508; *id.*, 1887, p. 53; McG., P.Z.V., 175. For other references and synonyms, see B.M.P. and Miss Jelly's Catalogue.

Zoarium encrusting. Zoœcia distinct, ovate, granular, several (usually four) oral spines; a small lunate or rounded pore (*trypa*) below the thyrostome; a sessile

*For a discussion of this subject see Hincks, A.M.N.H., Feb., 1887.

avicularium, with a pointed, frequently vibraculoid, mandible directed upwards and outwards on one side of the zoœcium. Oœcia large, granular.

Var. *spicata*, McG., P.Z.V., 175. Zoœcia finely granular or perforated; a stout conical process directed upwards from the front of the zoœcium below the trypa, which it conceals.

M.C. A common cosmopolitan living species.

The only specimens I have seen are of the variety *spicata*. The zoœcia are granular, or probably from the granulations being worn off, perforated with small pores. In many of the zoœcia the peristome is raised and produced inwards on each sides so as to be nearly personate.

2. *M. diadema*, McG.

Lepralia diadema, McG., P.Z.V., 37; L. canaliculata, l.c.; *Microporella diadema*, McG., T.R.S.V., Nov., 1884; P.Z.V., 175; Hincks, A.M.N.H., March, 1885; *M. decorata*, Waters, Q.J.G.S., 1882, p. 508; *id.*, 1887, p. 54; *id.*, A.M.N.H., Sept., 1887.

Zoarium encrusting. Zoœcia broad, distinct, areolated round the margins; trypa round or lunate; an avicularium on each side, with the long pointed mandible directed upwards and outwards. Oœcia in recent specimens with a beaded rim.

B. Living Australia and New Zealand.

Waters considers this species identical with the *Eschara decorata* of Reuss, a determination which I consider at least doubtful. The only fossil specimen I had was unfortunately mislaid before a drawing was made. For the varieties see P.Z.V., 175.

3. *M. malusii*, Audouin, sp. Pl. IX., fig. 1.

Lepralia malusii, Busk, B.M.C., Pt. II., 83; Crag. Pol. 53; McG., P.Z.V., 36; *Microporella malusii*, Hincks, B.M.P., 211; Waters, Q.J.G.S., 1883, 437; *id.*, 1887, p. 54; Busk, C.P., 137; McG., P.Z.V., 175.

Zoarium encrusting. Zoœcia distinct, ovate or pyriform, convex; trypa lunate, from a third to half-way down the zoœcium; numerous stellate pores arranged in one or more rows round the margin and beneath the lower lip of the thyrostome, leaving a clear space above the trypa; four or five oral spines.

S.P. A cosmopolitan living species.

4. *M. rudis*, n.sp. Pl. IX. fig. 2.

Zoœcia large, obscurely hexagonal; surface sparsely perforated and closely and minutely punctate; trypa semilunar, the convex edge above; thyrostome slightly

contracted below, peristome thickened and projecting, granulo-punctate like the surface.

S.P., a single zoœcium.

Tessaradoma, *Norman.*

Zoarium encrusting or foliaceous and unilaminate, or erect and ramose. Zoœcia with the peristome produced and turned forwards in a tubular or subtubular manner; a median tubular zoœcial pore (trypa).

The genus Tessaradoma was originally proposed by Norman for Busk's *Onchopora borealis*, a species subsequently included, as well as *T. magnirostris*, by Hincks in Porina. I have already (C.V.) proposed that those species agreeing with Porina in other respects but differing in the anterior pore opening directly into the body cavity should be included in Tessaradoma, while those in which the pore is external or peristomial should be referred to Porina.

1. *T. magnirostris*, McG. Pl. IX., fig. 19.

Lepralia magnirostris, McG., T.R.S.V., Oct. 1882; *Tessaradoma, id.*, McG., P.Z.V. 175; *Porina magnirostris*, Hincks, A.M.N.H, Oct. 1884; *Microporella introversa*, Waters, Q.J.G.S., 1882, p. 268.

Zoœcia indistinct; surface with numerous large rounded pores, except in the neighbourhood of the thyrostome; thyrostome arched above, nearly straight below; peristome thickened and raised; a large sessile avicularium on one or both sides of the zoœcium about the middle, with the triangular mandible directed straight outwards and encroaching on the adjacent zoœcium.

S.P.; M.C. Living. Australia.

2. *T. elevata*, Waters, sp. Pl. IX., fig. 28.

? Eschara elevata, Tenison Woods, T.R.S. N.S.W., 1876, p. 148; *Microporella elevata*, Waters, Q.J.G.S., 1881, p. 330.

Zoarium expanded, or lobed and bilaminate, or cylindrical, traversed by numerous anastomosing sharply raised ridges, inclosing angular depressed spaces in which are several irregularly shaped pores; usually one of these ridges surrounding the thyrostome; thyrostome (secondary) with the peristome thick, tubular and directed vertically forwards; usually several pores round the base of the peristome and opening into its chamber; a zoœcial pore (not always distinguishable externally from the other pores) some distance below the thyrostome; numerous rounded avicularia, with the mandibular transverse bar well marked at the anas-

tomoses of the ridges. Seen from behind, the zoœcia are much elongated, narrow; the thyrostome is rounded above, straight below, and there is the opening of a zoœcial pore, sometimes of considerable size, at other times quite small.

S.P.; M.C.; C.C. and B. (W.)

Judging from the very imperfect description and figure given by Mr. Woods, I cannot see any reason for identifying this with his *Eschara elevata*, and I therefore quote Waters as the authority for the name.

Adeona, *Lamouroux.*

Zoarium rarely encrusting, usually erect and bilaminate, entire or fenestrate. Zoœcia with the thyrostome subcircular or straight below; zoœcial pores single or clustered. In addition to the ordinary sessile avicularia usually found in the neighbourhood of the thyrostome and on other parts of the zoœcium, are other larger avicularia on special cells. Oœcia internal, consisting of modified zoœcia (gonœcia of Hincks.)

In this genus there are two groups of species, the one containing the *Adeonæ* of Lamouroux, being attached by a slightly flexible stem composed of a mass of radical tubes more or less calcified, the other, for which I have previously proposed a genus *Adeonellopsis*, having the zoarium attached by a rigid base. The species of the former group are all, with the exception of *A. foliacea* (Lamx.), fenestrate, while in the latter the zoarium is continuous and branched or lobed. The difference in the mode of attachment is perhaps scarcely of generic value, and I therefore now combine both groups as sections of the one genus.

*Zoarium attached by a flexible stem, composed of partially calcified radical tubes.

(*Adeona*, Lamouroux.)

1. *A. grisea*, Lamx. Pl. IX., fig. 5.

Adeona grisea, Lamx., P.C.F., 181; Kirchenpauer, Ueber die Adeona, 9; McG., C.V.; *Dictyopora grisea*, McG., P.Z.V., 66; *Microporella grisea*, form *Adeona*, Waters, Q.J.G.S., 1885, p. 294.

Zoarium expanded, erect, bilaminate, fenestrate; edges of fenestræ bordered by large, rounded, pitted or granular nodules. Zoœcia ovate, surface pitted; thyrostome subcircular; a small, deep pit in the centre of the zoœcium, from which a short, rather broad, avicularium extends obliquely upwards and outwards, the point reaching to immediately below the thyrostome to one side.

S.P.; M.C. Living. Australia.

Var. interdigitata, fig. 6. Zoœcia irregular in shape, separated by sinuous divisions, the lobes or processes from contiguous zoœcia frequently interdigitating.

S.P.

2. *A. cellulosa*, McG. Pl. IX., fig. 4.

Dictyopora cellulosa, McG., P.Z.V., 47; *Adeona cellulosa*, Kirchenpauer, Ueber die Adeona, 10; McG., C.V.; *Mieroporella cellulosa*, form *Adeona*, Waters, Q.J.G.S., 1883, p. 437.

Zoarium expanded, bilaminate, fenestrate, proliferous and cavernous (recent specimens); edges of the fenestræ with pitted or granular nodules. A large avicularium in front, with the mandible long, directed upwards and outwards, and reaching half-way up the side of the thyrostome.

S.P. Living. Australia.

One or two imperfect fragments seem referable to this species.

A. grisea and *cellulosa* are very closely allied. The only difference in the zoœcia is that in the former the avicularian mandibles are shorter and do not extend up the side of the thyrostome as they do in the latter. The fossil specimens are only small fragments, and do not shew the structure of the zoarium. This, however, in recent specimens is so different in the two forms that in my opinion they must be considered to be specifically distinct. In *A. grisea* the zoarium is broad, flabelliform and flat, not convoluted, and in all the specimens I have seen consists of a single plate. Kirchenpauer, however, says that it is sometimes proliferous. In *A. cellulosa* it is much larger, proliferous, and forming large cavernous cells. The colour, which in this genus is a character of some value, is dark grey or nearly black in the former, while in the latter it is brown, of a rather light tint.

**Zoarium attached by a rigid base.

(*Adeonellopsis*, McG.)

3. *A. obliqua*, n.sp. Pl. IX., figs. 7-11.

Microporella violacea, var. *fissa*, Waters, Q.J.G.S., 1881, p. 329.

Zoarium erect, bilaminate, divided into flat lobes. Zoœcia arranged in oblique series directed from the centre outwards on either side, ovate; surface round the margins punctured; a depression in the centre, with a small pore (trypa), which is seen posteriorly as a linear denticulate fissure; an elevation on one or occasionally on both sides (one then not so conspicuous) below the thyrostome; thyrostome

subcircular or straight below, peristome above projecting forwards. A large avicularium extending from the trypa obliquely to one side, the point situated opposite the middle of the thyrostome.

Var. *tumida*. Zoœcia short and broad; trypa round both anteriorly and posteriorly; lateral elevations more prominent and nodular or mamilliform; avicularia proportionally shorter and wider, and not extending so much to the side of the thyrostome.

S.P.; M.C.; B.R.; C.B.; Belm.; G. Var. *tumida*, L.B.

Occasionally there is an additional small avicularium at the base of the zoœcia. The lateral elevations are usually smooth, but are sometimes punctured. In some specimens the base of the depression for the mandibles has two sharp prolongations or denticles. On the edge of the zoarium is a series of avicularia with the mandibles pointing downwards.

Waters refers this species to *Microporella fissa* of Hincks (A.M.N.H., Nov., 1880), but although the species are evidently allied, I cannot agree with him in his determination.

4. *A. mucronata*, McG. Pl. IX., figs. 13, 14.

E. mucronata, McG., P.Z.V., 48; *Microporella coscinophora*, var. *armatas*, Waters, Q.J.G.S., 1881, p. 331; *id.*, A.M.N.H., July, 1889; *Eschara sulcata*, Milne Edwards, sur les Eschares, 43.

Zoarium occasionally crustaceous, but mostly erect, expanded, bilaminate and variously divided or lobed. Zoœcia ovate, elongated, distinct; surface usually sulcate close to the margins, with small perforations in the grooves; a deep depression, with a cluster of stellate pores about the middle of the zoœcium; thyrostome arched above, slightly hollowed below; an avicularium below the thyrostome, with the long narrow triangular mandible directed straight or occasionally obliquely upwards to the lower lip of the thyrostome; frequently an additional avicularium towards the base of the zoœcium below the perforated area, and rarely another on one or both sides of the thyrostome.

S.P.; M.C.; Bel.; C.C. (W.) Living. Australia.

Waters considers this form to be a variety of *E. coscinophora* of Reuss. In recent specimens there is a considerable amount of variation in the mode of growth and form of the zoarium, as well as in the size of the zoœcia and the number and situation of the avicularia. In T.R.S.V., 1885, I described several forms as distinct species, of which, however, *A. foliacea*, *A. latipuncta*, and *A. australis* ought probably rather to be considered as varieties of the present species.

5. *A. symmetrica*, Waters, sp. Pl. IX., fig. 12.

Microporella symmetrica, Waters. Q.J.G.S., 1881, p. 332.

Zoarium erect, very narrow, bilaminate. Zoœcia ovate, convex, distinct, the anterior part projecting forwards; surface smooth or minutely granular; usually a row of small pits or pores round the margin; a very large elliptical depression with two or rarely three rows of stellate pores; thyrostome arched above, straight or slightly hollowed below; on each side below the thyrostome an avicularium with the mandible directed obliquely upwards and inwards and reaching the level of the lower lip.

S.P.; M.C.; B.; B.R.; Orphanage Hill, Geelong; C.C. and W.P. (W.).

6. *A. clavata*, Stoliczka, sp. Pl. IX., figs. 15-18.

Flustrella clavata, Stol. Foss. Bryoz. der Orakei Bay, 139; *? Eschara lichenoides*, Busk, B.M.C., Pt. II., p. 90 (not Milne Edwards); *Microporella clavata*, Waters, Q.J.G.S., 1881, p. 332; *M. yarraensis*, Waters. *l.c.*, 1881, p. 31, and 1882, p. 267; *Adeonellopsis parvipuncta*, McG., T.R.S.V., 1885.

Zoarium forming narrow bilaminate branches. Zoœcia separated by narrow raised lines, ovate, elongated, anterior extremity raised; a smooth nodular enlargement on one or both sides (occasionally absent); thyrostome rounded above; two rounded pores (avicularian) below the thyrostome; anterior surface rarely convex and entire, usually depressed with a single pore or cluster of small stellate pores.

S.P.; M.C.; B.R.; C.C., B. and W.P. (W.). Living. Australia.

This is a very variable species. Sometimes there is a single suboral round pore, and in the form described as *A. yarraensis* by Waters there are three in a triangular space. The front of the zoœcium is occasionally convex and without depression, in which case there are usually no zoœcial pores, but in one convex specimen there are clusters of three or four small stellate pores. In one of the specimens with depressed front there is a vertical row of two or three round pores; in many there is a single large entire pore; while again there is frequently a cluster of small stellate pores. There is occasionally a pore, no doubt avicularian, at the base of the zoœcia. These different forms occur in various combinations, and there are frequently several in the same specimen. An examination of calcined specimens of *A. parvipuncta* shews it to be identical with the present species and that the suboral marks are avicularian.

Family Lepraliidæ.

Zoarium crustaceous, or erect and uni- or bilaminate or dendroid or cylindrical. Zoœcia horizontal, calcareous and destitute of membranous area, entire or variously

punctured, but without special pores; thyrostome rounded above, without special development of the peristome. Oœcia external.

Lepralia, *Johnston.*

Zoœcia usually closely united to each other; thyrostome semicircular or horse-shoe-shaped, usually slightly contracted at the sides; the lower margin straight, or slightly hollowed, or convex upwards, generally a small, sharp denticle on each side at or above the angle.

1. *L. abdita*, n.sp. Pl. X., fig. 1.

Zoarium encrusting. Zoœcia quadrate or obscurely hexagonal, nearly flat, with a row of small, deep areolæ along the distinct raised margins; thyrostome wide, straight below, with a small denticle at each angle. Oœcia round, prominent, at the base of the zoœcia, without external opening.

S.P.

The oœcia are very peculiar, being situated at the base of the zoœcia above the raised lower margin, and having no external opening. The zoœcium below has no thyrostome. It is, however, possible that the closure of these zoœcia may be abnormal, and that other specimens may shew the usual structure. In *Cellepora abdita* the oœcia have a similar structure.

2. *L. quadrata*, McG. Pl. X., figs. 2, 3.

Eschara quadrata, McG., P.Z.V., 48; *Lepralia, id.*, C.V.

Zoarium erect, foliaceous, uni- or bilaminate. Zoœcia usually in linear series, elongated, quadrate, slightly convex or nearly flat, with numerous rounded pits or pores; thyrostome rounded above, contracted below, the lower lip arched upwards, a sharp denticle at each angle; avicularia short, broadly spatulate, very rare in the fossils. Oœcia large, perforated.

M.C.; B. Living. Australia.

Most of the fossil specimens are unilaminate, but they are of small size, and I believe this condition is owing to the splitting of the layers. The zoœcia in recent specimens are separated by raised margins, absent, however, in almost all the fossils. The distinctness of the pits or pores varies. The avicularia seem to be very rare in the fossils, the only one I have seen being that shewn in fig. 3. In recent specimens they are frequently found on each side of a thyrostome below an oœcium. The oœcia are porous or pitted like the zoœcia, and may be traversed by raised lines. The oral denticles are not always visible even in recent specimens.

3. *L. rectilineata*, Hincks. Pl. X., fig. 4.

Lepralia rectilineata, Hincks, A.M.N.H., Oct., 1884; Waters, Q.J.G.S., 1887, p. 60.

Zoarium encrusting. Zoœcia, large, distinct, ovate, convex; a row of linear pores along the margins, with occasionally others internally, numerous shorter pores at the sides of and above the thyrostome; thyrostome large, rounded above, contracted below, the lower lip arched upwards, a sharp denticle on each side above the angle; an elliptical avicularium, with the mandible directed downwards and outwards on each side below the thyrostome.

M. Living. New Zealand.

This seems to be identical with Hincks' species, although the thyrostome differs slightly and the pores are somewhat differently arranged. There seems to have been a row of pores along the upper edge of the thyrostome.

4. *L. subimmersa*, McG. Pl. X., figs. 5, 6.

Lepralia subimmersa, McG., P.Z.V., 35; Hincks, A.M.N.H., Oct., 1884; Waters, Q.J.G.S., 1885, p. 299.

Zoarium crustaceous. Zoœcia large, not much elevated, with narrow raised margins; surface with numerous small round pores; thyrostome large, the lower lip slightly hollowed and an internal denticle at each angle; an elliptical transverse avicularium on the middle of the lower lip. Oœcia rounded, subimmersed.

B.; M. Living. Australia.

5. *L. pertusa*, Esper, sp. Pl. X., fig. 8.

Lepralia pertusa, Busk, B.M.C., II., p. 80; Hincks, B.M.P., 305; *Escarella pertusa*, Smitt, Floridan Bryozoa, II, 55.

Zoarium crustaceous. Zoœcia ovate, very convex, arranged in linear series separated by very narrow raised margins; surface with numerous small round pores; thyrostome widely arched above, contracted towards the lower lip, which is straight or slightly hollowed, a small denticle at each angle; peristome slightly raised above, thin.

M.C. Living. Europe, North America, Australia.

The species described and figured in P.Z.V. is not the present, but *L. pallasiana*.

6. *L. nodulosa*, n.sp. Pl. X., fig. 9.

Lepralia cleidostoma, var. *rotunda*, Waters, Q.J.G.S., 1881, p. 336.

Zoarium encrusting. Zoœcia small, subrotund, distinct, convex, covered with large granulations or nodules; thyrostome nearly circular, with a small sharp denticle on each side giving the appearance of a wide sinus; a small, round or elliptical avicularium on a prominent elevation to one side of the thyrostome.

M.C.; B.R. Living. Australia.

This seems to be the form considered by Waters as a variety of Smitt's *L. cleidostoma*, and, if so, is probably identical also with that described by Hincks as the same species, var. *orbicularis* (A.M.N.H., Aug., 1881), dredged abundantly by Captain Cawn Warren in Bass's Straits. So far, however, as I can judge from Smitt's description and figures, they appear to me to be totally distinct species.

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7. *L. præclara*, n.sp. Pl. X., fig. 14.

Zoœcia wider in the middle so as to be nearly hexagonal, separated by narrow raised margins immediately within which is a row of small round pores; surface smooth and hyaline; thyrostome large, expanded and rounded above, the lower lip slightly hollowed, and having a small sharp denticle at each angle; an avicularium on a slight elevation below the thyrostome, situated mesially or to one side. Oœcia large, prominent, flattened in front, the circumference smooth, the central part with numerous small concentrically arranged pores.

B.R.

8. *L. perforata*, n.sp. Pl. X., fig. 15.

Zoarium unilaminate, probably crustaceous. Zoœcia broad, separated by narrow raised margins; surface smooth, with numerous round pores, mostly in two rows round the sides, leaving the central part entire; thyrostome large, arched above, the lower edge straight, and with a minute denticle at each angle; a slight swelling of the zoœcium immediately below the thyrostome, supporting a small avicularium.

S.P.

9. *L. elongata*, n.sp. Pl. X., figs. 12, 13.

Lepralia foliacea, Waters, Q.J.G.S., 1882, p. 269 and 508.

Zoarium bilaminate. Zoœcia in linear series, much elongated, with narrow raised margins, immediately within which is a row of small round pores; surface smooth; thyrostome large, rounded above, lower lip nearly straight or slightly hollowed, a sharp denticle on each side; a small avicularium immediately below the thyrostome, either in the middle line or a little lower, and to one side.

M.C.; B.; M.

Waters figures this species from Mount Gambier, referring it to the European *L. foliacea*. In his Bairnsdale paper he says it may possibly have to be specifically separated. Judging from the descriptions and the specimens of *L. foliacea* I have examined, I see no reason for referring it to that species, and therefore describe it as new.

10. *L. hebetata*, Waters, sp. Pl. VIII., fig. 7.

Monoporella hebetata, Waters, Q.J.G.S., 1882, p. 271.

Zoarium unilaminate, probably encrusting. Zoœcia distinct, rounded, with numerous large, close, round pores; thyrostome arched above, contracted below, the lower lip straight, a small internal denticle at each angle, and several spines on the upper margin; a pore or depression, seemingly avicularian, on each side of the thyrostome. Posterior surface having the zoœcia indistinct, with numerous small perforated tubercles probably for the attachment of radical tubes.

M.

The specimen figured does not shew the internal denticles of the thyrostome, but in another they are distinct. The form of the thyrostome and the presence of the denticles shew that it should be referred to Lepralia.

11. *L. crassalina*, Waters, sp. Pl. VIII., fig. 4.

Monoporella crassalina, Waters, Q.J.G.S., 1882, p. 270.

Zoarium bilaminate. Zoœcia distinct, separated by grooves, the margins occasionally very slightly raised, more or less hexagonal, surface with numerous rather small pores; thyrostome large, rounded above, straight below, situated a little below the upper extremity of the zoœcium; peristome slightly thickened.

M.C.; M. Living. New Zealand.

There may be some doubt as to the proper systematic position of this species. On the whole it seems to me to belong to Lepralia. Waters places it and the last species, as well as *Macropora clarkei*, in Monoporella, a genus proposed by Hincks for the reception of two species from Bass's Straits, *M. nodulifera* and *M. lepida*, to which he subsequently added *M. albicans* from Singapore and *M. brunnea* from Queen Charlotte Islands. Of these *M. lepida* is clearly a Micropora, while *M. albicans* should probably go to Cellepora, where it has already been placed by Waters. *M. nodulosa* might be taken as the type of a genus, with which, however, *M. brunnea* could scarcely be associated.

12. *L. cava*, n.sp. Pl. X., fig. 23.

Zoarium unilaminate, expanded and calyculate. Zoœcia nearly ovate, irregularly arranged, concave, with thickened raised margins; surface with numerous

small round pores; thyrostome contracted below, lower lip straight or slightly hollowed. Dorsal surface with the zoœcia distinctly shown separated by flat thickened margins immediately within which is a row of large pores; other smaller pores or pits scattered over the surface.

L.B.

13. *L. vermicularis*, n.sp. Pl. X., fig. 20.

Zoarium unilaminate. Zoœcia indistinct, but with a depression between them; upper part slightly raised forwards; surface with irregularly shaped pores and areolations separated by sinuous convex ridges; thyrostome arched above, the lower lip nearly straight; peristome thickened.

B.

14. *L. hamiltoniensis*, n.sp. Pl. X., fig. 24.

Zoarium unilaminate. Zoœcia distinct, ovate, without raised margins, convex, obscurely granular, an irregular row of pores or deep round areolæ along the margins and occasionally a few others on the surface; thyrostome semicircular, the lower lip slightly hollowed, a denticle on each side; an avicularium to one side of the thyrostome.

M.C.

15. *L. filiformis*, Waters, sp. Pl. X., fig 28..

Schizoporella filiformis, Waters, Q.J.G.S., 1882, p. 274.

Zoarium cylindrical, with about six rows of zoœcia. Zoœcia alternate in longitudinal series, elongated, somewhat quadrate at the extremities, separated by prominent smooth straight margins; surface punctate and granular, very slightly convex; thyrostome higher than wide, arched above, hollowed below, with a sharp denticle on each side, peristome raised.

S.P.

Waters refers this species to Schizoporella, but the hollow in the lower lip is not a true sinus, and the oral denticles shew that it ought to be placed in Lepralia.

16. *L. duplex*, n.sp. Pl. X., fig. 16.

Zoarium probably bilaminate. Zoœcia much elongated, narrow, separated by raised margins, nearly flat, obscurely divided by the markings into two portions, the upper with a row of deep areolæ round the margins and a second row of similar but smaller pores within these, leaving a clear central space, the lower portion with large pores or areolæ occupying the whole width of the zoœcium; thyrostome wide, nearly semicircular, but with the upper margin slightly flattened, the lower lip slightly

hollowed and with a sharp denticle at each angle; seemingly a minute avicularium on the edge of the lower lip.

B.

17. *L. pachystoma*, n.sp. Pl. X., fig. 7.

Zoarium bilaminate, branched. Zoœcia elongated, distinct, separated by narrow, faint, raised lines; surface with numerous pores, larger towards the edges, which are smooth; thyrostome lofty, nearly elliptical, the lower lip being hollowed, a conspicuous denticle on each side about two-thirds down the aperture; the whole thyrostome surrounded by a smooth, broad, thickened rim.

M.

18. *L. vagans*, n.sp. Pl. X., fig. 22.

Zoœcia irregularly arranged in spreading clusters, broadly ovate or longer and narrower, margins raised, very calcareous with numerous close round pores; thyrostome lofty, straight or slightly hollowed below, a stout denticle above the angle on each side.

B. Growing on *L. bairnsdalei.*

19. *L. bairnsdalei*, Waters. Pl. XII., fig. 3.

Lepralia bairnsdalei, Waters, Q.J.G.S., 1882, p. 509.

Zoarium in bilaminate branching lobes. Zoœcia much elongated, quadrate at the ends, distinct, margins thick and raised; large areolæ or pores round the margins and other smaller pores on the rest of the surface which is very calcareous; thyrostome large, lofty, contracted below the middle by a conspicuous denticle, lower lip straight or slightly hollowed, with a considerable rounded avicularium (frequently absent) in the depression immediately below the lower lip.

B.

In some specimens the suboral avicularium is a conspicuous feature, being present in almost all the zoœcia. It has then very much the appearance of a Porella, from which, however, it differs in the absence of a median denticle or lyrula. In most specimens the avicularia are absent, or occur only very rarely.

20. *L. monilifera*, Milne Edwards, sp. Pl. XIV., fig 28.

Eschara monilifera, Milne Edwards, Sur les Eschares fossiles, p. 1; Busk, Crag Polyzoa, p. 68.

Zoœcia much elongated, separated by very narrow raised lines, a row of round pores in a groove within the margin; central part of zoœcia raised; thyrostome

arched above, higher than wide, wider below, lower lip hollowed, with an internal denticle on each side; peristome thickened, with a small avicularium on one or both sides having the mandible directed upwards and inwards.

M.C.

The only specimen I have seen is the fragment figured, which is in a single layer with the backs of the zoœcia broken away. They are, however, perfect in front and precisely agree with the description and figure given by Milne Edwards.

21. *L. corrugata*, Waters. Pl. X., fig. 26, Pl. XIV., fig. 27.

Lepralia corrugata, Waters, Q.J.G.S., 1881, p. 335.

Zoarium encrusting or in bilaminate lobes or branches. Zoœcia usually much elongated, convex, surface with short longitudinal ridges and a variable number of pores in the intervening furrows; upper part of zoœcium immediately below the thyrostome produced forwards into a large smooth mucro-like elevation with a large avicularium on one side and occasionally other smaller avicularia; thyrostome large, semicircular, straight below, with a sharp denticle above each angle; 5-8 spines round the upper margin; a small rounded avicularium usually near each angle of the thyrostome, and occasionally others scattered over the zoarium, especially in the depression between the zoœcia.

S.P.; M.C.; B.; C.B.; L.B.; C.C. (W.).

The most characteristic feature of this species is the development of the mucroid elevation of the zoœcium below the thyrostome. In one form this is not so large, and the aperture consequently is not obscured, the denticles being visible on both sides. It may be called variety *lata*. In another var., *apiculata*, the zoœcia are narrower, the processes much developed, the apex produced into a tube bearing on its summit a small avicularium; on the outer side is a very long rather narrow avicularium occupying the whole side. The depth of the furrows between the ridges, the number of pores and the number and situation of the small avicularia vary a good deal. At first sight it bears a considerable resemblance to Palmicellaria, but the mucroid process is really the upper part of the zoœcium and the thyrostome is essentially Lepralian.

22. *L. gippslandii*, Waters. Pl. X., fig. 21.

Lepralia gippslandii, Waters, Q.J.G.S., 1882, p. 509.

Zoœcia ovate, convex, distinct, with numerous small indistinct pores; thyrostome small, semicircular. "Oœcia globose, punctate," Waters.

B., on *L. bairnsdalei*.

23. *L. rotundata*, n.sp. Pl. X., fig. 18.

Zoœcia distinct, ovate or rounded; surface closely occupied by minute round pores; thyrostome contracted below, the lower lip hollowed; several spines above.

L.B. A single minute fragment.

24. *L. graysoni*, n.sp. Pl. X., fig. 17.

Zoœcia elongated, quadrate, with slightly raised rather thick margins, flat but somewhat receding towards the thyrostome, a row of large pores along the margins and numerous smaller pores irregularly scattered over the surface; thyrostome semicircular, lower lip much projecting upwards, a stout sharp denticle above the rounded angle on each side.

M.

I have much pleasure in dedicating this species to Mr. Henry Grayson, to whom I am indebted for the Moorabool specimens and for valuable assistance in preparing the others.

25. *L. continua*, n.sp. Pl. XII., fig. 4.

Zoarium bilaminate. Zoœcia separated by very narrow lines mostly obliterated, with numerous small round pores; thyrostome nearly semicircular, lower lip convex upwards, forming a small mucro-like projection, a small denticle on each side.

M.C.

26. *L. obliqua*, n.sp. Pl. XII., fig. 5.

Zoarium bilaminate. Zoœcia separated by prominent raised lines; surface roughly granular with numerous small pores between the granulations; thyrostome straight or generally oblique, arched above, contracted below, the lower lip convex upwards forming a mucro-like projection, a small denticle on each side.

B.

27. *L. spatulata*, Waters. Pl. X., fig. 25.

Lepralia spatulata, Waters, Q.J.G.S., 1881, p. 335.

Zoarium cylindrical, probably from growing round a narrow alga. Zoœcia distinct, separated by narrow raised lines, upper extremity raised, surface finely granular; thyrostome subcircular, higher than wide, on each side internally a narrow ridge separated by a groove from the outer part; six spines above.

S.P.

Waters mentions that in a specimen from Mount Gambier there are many large spatulate zoœcial avicularia scattered over the stem. It is readily distinguished by the peculiar conformation of the thyrostome.

28. *L. vallata*, n.sp. Pl. X., fig. 19.

Zoœcia elongated, wider in the middle, nearly straight above and below, separated laterally by thick much-raised margins; surface with numerous small round pores; thyrostome large, contracted below to the lower lip, which is slightly elevated in the centre; peristome thickened, especially below where it supports an avicularium.

M.

Only the fragment figured and another smaller seen, but it seems very distinct from any other species.

PALEONTOLOGIE

Bulbipora, *n.g.*

Zoarium encrusting. Zoœcia with posterior part decumbent, anterior portion raised, much enlarged and turned forwards; thyrostome terminal, arched above, lower lip straight or nearly so, and entire.

1. *B. areolata*, n.sp. Pl. XIII., fig. 15.

Zoœcia distinct, narrowed posteriorly, a row of deep areolations along the margin leaving a central smooth space; anterior half swollen and bulbous, directed forwards, smooth; thyrostome large, rounded above, slightly narrowed below, the lower lip straight or very slightly projecting; several spines on the upper margin. Oœcia round, smooth, situated above the thyrostome and incorporated with the zoœcium above.

M.C., on a Retepore.

Plagiopora, *n.g.*

Zoarium erect, unilaminate, biserial. Zoœcia with the thyrostome placed obliquely across the extremity, lofty, narrow, arched above, hollowed below and contracted about the junction of the middle and lower thirds; distinctly separated behind; an avicularium in front to the side of the thyrostome and one externally beneath the upper angle.

1. *P. disticha*, n.sp. Pl. XIII., fig. 14.

Zoarium in narrow, unilaminate, biserial branches. Zoœcia alternate, the inner borders forming a zigzag line down the centre of the branch; each zoœcium wider and more prominent above, the inner part inserted between two zoœcia of the opposite series; the lower part depressed, hollowed and smooth, an oblique vitta-like band, with a row of small inconspicuous pores, separating this from the upper more

prominent half of the zoœcium; outer edge of zoœcium produced at the upper angle and having a small sessile avicularium on the edge looking directly outwards; below this avicularian process a small sharp point formed by a narrow raised ridge extending from the anterior vitta backwards; thyrostome large, twice as high as wide, rounded above, slightly hollowed below, contracted at the junction of the middle and lower thirds, directed obliquely, the lower lip being to the outside; an avicularium on the raised inner portion of the zoœcium close to the upper part of the thyrostome. Posteriorly a vertical raised band running along the centre of the branch, with cross bands marking the boundaries of the zoœcia, and others similar going to the anterior vittate band, and at the passage round the edge forming the projection below the lateral avicularian process.

M.C.

Family Schizoporellidæ.

Zoarium crustaceous or expanded and uni- or bilaminate, or dendroid or cylindrical; or discoid, unilaminate and free. Zoœcia calcareous, destitute of membranous area, entire or variously punctured, but without special pores; thyrostome rounded above, with a distinct notch or sinus in the lower lip; no special development of the peristome. Oœcia external.

Schizoporella, *Hincks.*

Zoœcia closely adherent to each other; thyrostome semicircular or suborbicular, having a notch or sinus in the lower lip; avicularia lateral or suboral, mandible variously shaped, not vibraculoid. Oœcia entire in front.

1. *S. cecilii*, Audoin, sp. Pl. XI., fig. 1.

Lepralia cecilii, Busk, Q.J.M.S. V. 173; McG., P.Z.V., 35; *Schizoporella cecilii*, Hincks, B.M.P., 269.

Zoarium encrusting. Zoœcia broad, ovate, rhomboidal or hexagonal, distinct, with slightly raised margins; anterior surface slightly convex, with numerous round punctures, the central portion being usually clear and smooth or umbonate; thyrostome nearly terminal, semicircular, with a rather narrow sinus in the lower lip; peristome slightly raised above. Oœcia large, rounded, slightly granular.

B. A widely-distributed living species.

2. *S. phymatopora* Reuss. Pl. XI., figs. 2, 3.

Schizoporella phymatopora, Waters, Q.J.G.S., 1881, p. 338.

Zoarium cylindrical, branched. Zoœcia alternate in linear series, irregularly ovate, with sharply-defined raised margins, upper part slightly raised and turned

forwards or occasionally obliquely to one side; thyrostome semicircular, lower lip straight, with a small sharply-defined rounded sinus; peristome thickened; surface finely granular and sometimes perforated; an avicularium, with broadly triangular or rounded mandible, usually on one side about the middle, directed outwards or obliquely upwards. Oœcia large, slightly prominent, immersed in the zoœcium above.

S.P.; M.C.; C.B.; B.R.; M.; C.C. (W.).

There are usually four or six rows of zoœcia in a cylinder. In one specimen the zoarium is in a single layer. In some the avicularia are absent.

3. *S. plagiostoma*, n. sp. Pl. XI., fig. 4.

Zoarium in cylindrical form probably from having encrusted narrow algæ. Zoœcia much elongated, quadrate, slightly narrowed below, arranged in transverse or spiral series, with distinct raised margins; surface finely granular and perforated; thyrostome situated obliquely in an upper angle of the zoœcium, broad, lower lip straight, with a small rounded sinus, peristome on upper edge slightly thickened.

S.P.; B.R.; C.B.; M.

The zoœcia are arranged in a slightly oblique and transverse manner, and in the complete cylinder would probably be spiral. It differs from *S. phymatopora* in the quadrate form of the zoœcia, and especially in the peculiar position of the oblique thyrostome in an upper angle of the zoœcium. In some specimens, as in that figured, there is an avicularium on one side, close to the margin, with the triangular mandible directed straight upwards. In these also the anterior extremity is not so quadrate, but is rather acuminate, and the whole turned to one side.

4. *S. lata*, MeG. Pl. XI., fig. 5.

Schizoporella lata, MeG., P.Z.V., 138; *? S. marsupifera*, Busk, C.P., p. 165.

Zoarium crustaceous. Zoœcia arranged in linear series or irregularly, quadrate or ovate, with distinct raised margins; surface granular or granulo-punctured; thyrostome rounded above, contracted below, with a rather wide sinus; below the sinus an avicularium with the mandible directed downwards.

B. Living. Australia.

The size of the avicularium varies, being sometimes quite small and situated on a slight elevation, at other times long and narrow. It is allied to *S. triangula* (Hincks) but differs in the thyrostome being rounded above and not triangular, as in that species. Both are common, living at Port Phillip Heads.

5. *S. rugosa*, n.sp. Pl. XI., fig. 6.

Zoarium small, cylindrical. Zoœcia alternate in longitudinal series, indistinct; surface irregular, with pores and sharp ridges, one of which crosses obliquely about the middle; a round pore (probably avicularian) immediately above the transverse ridge; thyrostome arched above, straight below, with a small sinus.

S.P., a single specimen.

6. *S. australis*, Tenison Woods. Pl. XI., fig. 7.

Tetrapleura australis, Tenison Woods, T.R.S.N.S.W., 1878, p. 5; *Schizoporella australis*, Waters, Q.J.G.S., 1881, p. 341.

Zoarium filiform, with the zoœcia arranged alternately in four series facing different ways. Zoœcia very much elongated, separated by distinct raised lines, narrowed below, the upper part slightly projecting; surface finely and regularly closely granular; thyrostome at the extreme upper end, semicircular, contracted and straight below, with a small slightly rounded sinus; on each side of the thyrostome a small articulated spine.

S.P.; C.C. and B.R. (W.)

7. *S. submersa*, Waters. Pl. XI., figs. 8, 9.

Schizoporella submersa, Waters, Q.J.G.S., 1881, p. 340.

Zoarium bilaminate, usually erect in narrow lobes, occasionally broader. Zoœcia alternate, long, broad above, contracted and narrow below; surface irregularly granular or smooth, pitted and with a submarginal row of pits or areolæ; thyrostome lofty, higher than wide, arched above, nearly straight below, with a deep narrow sinus; usually an avicularium on one or both sides near the middle of the zoœcium, with the slender mandible directed inwards, sometimes absent, and a smaller avicularium by the side of the thyrostome.

S.P.; M.C.; B.; B.R.; C.C. (W.).

8. *S. schizostoma*, McG. Pl. XI., figs. 10, 11.

Lepralia schizostoma, McG., P.Z.V., 38; *Schizoporella schizostoma*, Waters, Q.J.G.S., 1883, p. 439.

Zoarium encrusting. Zoœcia ovate, separated by narrow raised lines or indistinct, convex; surface granular or nearly smooth, with usually a slight eminence a short distance below the thyrostome; thyrostome semicircular, the lower lip straight with a narrow slit-like sinus. Oœcia very large, globular, granular.

Var. *armata*. Zoœcia somewhat quadrate; a rounded avicularium near an angle of the zoœcium above.

S.P.; B.; W.P. (W.) Living. Australia.

9. *S. strictifissa*, n.sp. Pl. XI., fig. 12.

Zoœcia distinct, irregularly arranged, rounded, convex; thyrostome semicircular, with a deep, narrow, wedge-shaped sinus in the lower lip; a small avicularium (frequently absent) on one or both sides opposite the lower part of the thyrostome.

B.

10. *S. crenulata*, n.sp. Pl. XI., fig. 13.

Zoarium encrusting. Zoœcia irregularly arranged, more or less ovate, with narrow raised margins; surface smooth or granular; thyrostome arched above, with a deep rounded sinus in the lower lip, edge of the upper lip finely crenulate or denticulate; unarmed or with three or four spines above; occasionally a small elliptical avicularium on the lower part of the zoœcium.

S.P.

11. *S. profunda*, n.sp. Pl. XI., fig. 14.

? *Schizoporella fenestrata*, Waters, Q.J.G.S., 1881, p. 339.

Zoarium bilaminate, lobed. Zoœcia regular, quincuncial, smooth, separated by narrow raised lines; thyrostome at the bottom of a deep depression which includes also the base of the zoœcium above, the lower lip with a small rounded sinus, the peristome thin and produced; about five spines above the peristome; a transverse elliptical raised avicularium below the thyrostome towards one side, on the edge of the elevated portion of the zoœcium.

S.P.; M.C.; C.B.; M.

This species has a very peculiar and characteristic appearance, owing to the thyrostome being situated at the bottom of a deep pit sinking abruptly from the zoœcium to the lower lip, and rising more gradually where it involves the base of the zoœcium above. On the elevated portion of the zoœcium, where it bends down to the thyrostome, is a large elliptical avicularium placed nearly transversely. On the extreme lateral zoœcia these avicularia are occasionally very largely developed, spreading outwards beyond the edge of the zoarium, the mandible being long and more triangular. The surface of the zoœcia is smooth and glistening, with usually a few small pores about the margins. The avicularia are occasionally absent.

12. *S. dædala*, McG. Pl. XI., fig. 15.

Schizoporella dædala, McG., P.Z.V., 138; *S. conservata*, Waters, Q.J.G.S., 1881, p. 340.

Zoarium encrusting. Zoœcia broad, distinct, margins deeply arcolated; thyrostome large, arched above, straight below, with a moderate-sized sinus; 5-7 spines on the upper margin; a large avicularium extending horizontally outwards on each side, or occasionally on one side only, about the middle of the zoœcium.

S.P.; B.; M.; C.C. (W.) Living. Australia.

A full description of recent specimens will be found in P.Z.V.

13. *S. auriculata*, Hassall. Pl. XI., fig. 16.

Lepralia auriculata, Busk, B.M.C., II., p. 67; Schizoporella auriculata, Hincks, B.M.P., 260.

Zoarium bilaminate (in the fossils). Zoœcia distinct, arranged in linear series separated by grooves, elongated, of nearly uniform width, convex, smooth; thyrostome semicircular, the straight lower lip with a distinct sharp sinus; below the thyrostome an elevation with a conspicuous round (avicularian) pore; a triangular avicularium (frequently absent), with long triangular mandible directed inwards, close to the margin on one or both sides. Oœcia large, subimmersed.

M.C.; B.R.; M.

In some specimens the zoœcia are more convex than in that figured, and in many, close to the margin, are several slit-like pores arranged longitudinally. The lateral avicularia are frequently absent. The oœcia in all the specimens shewing them are largely open in front, the opening being bounded by a semicircular margin, which may be the growing edge, or may bound a space occupied by a thinner material or membrane.

14. *S. subsinuata*, Hincks. Pl. XI., fig. 17.

Schizoporella subsinuata, Hincks, A.M.N.H., Oct., 1884; McG., P.Z.V., 138.

Zoarium encrusting or loosely adnate. Zoœcia ovate, separated by narrow raised lines; surface granular; thyrostome arched above, contracted below and with a wide very shallow sinus.

B. Living. Australia.

I have only a few small imperfect fragments. It is distinguished by the wide, very narrow sinus occupying almost the whole width of the lower lip. It may be doubted whether it should not rather be referred to *Lepralia*.

15. *S. ridleyi*, McG. Pl. XI., fig. 18.

Schizoporella marsupium, Ridley, Pr. Zool. Soc. Lond., Jan., 1881; *S. ridleyi*, McG., P.Z.V., 138.

Zoarium encrusting. Zoœcia distinct, smooth or areolated at the margins; thyrostome large, semicircular, contracted below, with a small rounded sinus in the straight lower lip; below the thyrostome a small avicularium on a large rounded elevation. Oœcia large, rounded.

M.C. Living. Patagonia and Australia.

16. *S. arachnoides*, McG. Pl. XI., fig. 19.

Schizoporella arachnoides, McG., P.Z.V., 138.

Zoarium crustaceous. Zoœcia ovate, distinct, convex, smooth; thyrostome semicircular, straight below, with a distinct, rounded sinus; several (six or seven) round the sinus, of which the lower on each side are a little removed from its margin. Oœcia (in recent specimens) rounded, smooth, the edges usually sculptured.

M.C. Living. Australia.

Only the single imperfect specimen figured in which the characters are not well marked. I have, however, no doubt of the identification.

17. *S. biaperta*, Michelin, sp. Pl. XI., fig. 20.

Lepralia biaperta, Busk, Crag. Pol., 37; *Hippothoa biaperta*, Smitt, F.B., 46; *id., H. divergens, l.c.*, 47; *Schizoporella biaperta*, Hincks, A.M.N.H., July, 1881, May, 1884.

Zoarium encrusting. Zoœcia broad, distinct, smooth, very slightly convex; thyrostome semicircular, contracted below and with a narrow slit-like sinus; on one side of the thyrostome a large bullate eminence on the upper part of which is an avicularium with the narrow mandible directed downwards.

M.C. Living. Arctic Seas, England, North America, Australia.

18. *S. convexa*, n.sp. Pl. XI., fig. 21.

Zoarium encrusting. Zoœcia hexagonal, distinct, convex, surface smooth or slightly granular; a series of small areolations round the margins; thyrostome

semicircular, the straight lower edge with a small round sinus; four spines on the upper edge.

M.C.

19. *S. nitens*, n.sp. Pl. XI., fig. 22.

Zoœcia large, nearly hexagonal but rounded above, separated by narrow raised margins, within which are some minute areolations, convex, smooth and shining; thyrostome large, wide, arched above with rounded angles below, lower lip straight with a large round sinus; several spines (very obscurely indicated) above; on some of the zoœcia an avicularium with long mandible directed upwards and inwards, on one side of the thyrostome close to the margin.

M.C.

20. *S. bombycina*, Waters. Pl. XI., fig. 23.

Schizoporella bombycina, Waters, Q.J.G.S., 1882, p. 274.

Zoarium encrusting or bilaminate. Zoœcia distinct, convex, smooth, frequently with small areolations at the margins; thyrostome semicircular, with a wide sinus below; a rounded elevation, with a small avicularium with triangular mandible, to one side and slightly below the thyrostome.

B.

None of my specimens have oœcia. They are described and figured by Waters as very small.

21. *S. rostrata*, McG. Pl. XI., fig. 24.

Schizoporella rostrata, McG., P.Z.V., 186.

Zoarium encrusting. Zoœcia ovate, separated by very narrow, raised lines; surface with numerous pores; thyrostome with a wide shallow sinus in lower lip; a hollow, pointed, elevated process from immediately below the lower lip arching over the lower part of the thyrostome and with an avicularium to one side. Oœcia large, globular, obscurely porous.

B. Living. Australia.

22. *S. alata*, n.sp. Pl. XI., fig. 25.

Zoarium encrusting. Zoœcia very broad, widely expanded above with a sharp angle superiorly on each side, separated by narrow raised lines; surface nearly flat, closely and finely granular; thyrostome semicircular, straight below, with a rounded sinus, the whole peristome slightly thickened.

M.C.

A very distinct and beautiful species. I have only the fragment figured, and from the appearance of the broken zoœcia on its edges, it is probable that they are not all so widely expanded.

23. *S foveata*, n.sp. Pl. XI., fig. 26.

Zoœcia indistinct, sides very much raised and tumid; thyrostome at the bottom of a depression, lofty, arched above, lower lip straight, with a distinct, rather narrow, rounded sinus.

B.

I have only seen a single small specimen of a mamilliform shape and probably forming the extremity of a branch.

24. *S. granulata*, n.sp. Pl. XI., fig. 27.

Zoarium thick, encrusting. Zoœcia large, ovate, distinct, granular, deeply areolated round the margins; thyrostome large, semicircular or somewhat squared above, lower edge straight, with a distinct sinus contracted at the entrance; peristome thickened with a peristomial or subperistomial process, frequently squared, immediately below the sinus; frequently an avicularium on one side in the situation of an areola, with the triangular mandible directed outwards. Oœcia considerably immersed, granular.

S.P.

Gemellipora, *Smitt.*

Zoarium crustaceous or erect and ramose. Thyrostome subcircular or pyriform, with a sharp denticle on each side below, projecting inwards, and contracting the entrance of a deep rounded sinus.

1. *G. elegantissima*, n.sp. Pl. XI., fig. 28.

Zoarium encrusting or erect, cylindrical and branched. Zoœcia ovate, distinct, separated by narrow raised lines, surface closely and finely granular; thyrostome small, subcircular, with a rounded sinus below, contracted at its entrance by a sharp angle or denticle on each side; a small raised avicularium to one side of the thyrostome.

M.C.

This may be the *Schizoporella excubans* of Waters (Q.J.G.S., 1881, p. 341.)

2. *G. polita*, n.sp. Pl. XI., fig. 29.

Zoarium encrusting. Zoœcia indistinct, irregularly arranged, polished and shining; thyrostome pyriform, with a small rounded sinus opening by a narrow neck

formed by a sharp denticle on each side; occasionally a small avicularium, with triangular pointed mandible, to one side of the thyrostome.

M.C.

The whole surface is polished and glistening, and traversed by faint raised lines.

Haswellia, *Busk.*

1. *H. longirostris*, McG. Pl. XIV., fig. 20.
(For description see Appendix).

2. *H. producta*, n.sp. Pl. XIV., figs. 16-19.
(For description see Appendix).

Bipora, *Whitelegge.*

Zoarium bilaminate and expanded, or unilaminate and orbicular or conical, the zoœcia resting on a cancellated base. Zoœcia immersed, originating in two ways, either between the marginal zoœcia or intercalated among the older; thyrostome arched above, with a distinct sinus in the straight lower lip and a small pore on the edge of the upper reversed, the free edge of the operculum being directed from the growing edge to the apex in the conical form and to the base in the bilaminate. Oœcia external globose.

The genus *Bipora* was proposed by Whitelegge (Pr.L.S.N.S.W., June, 1887) for, among others, the species described as *Lunulites philippinensis* and *cancellata* by Busk, of the generic position of which Busk himself was very doubtful. The zoœcia originate in two ways, those at the edge being at first nearly tubular and projecting beyond the margins of the zoarium, besides which others are developed between the old zoœcia in various parts. According to Whitelegge, in recent specimens "the first indication of the formation of a new zoœcium appears on the upper surface of the zoarium as an elevated or depressed round spot bordered on one side by a thin layer of epitheca. At this point the 'semilunar slit with the concavity directed outwards' (already noticed by Haswell) is formed, and by the gradual extension of this slit to a circular form a piece of the calcareous lamina is cut out, the resulting opening being that of the peristome, and at a short distance below the true aperture is seen to be also in a fully formed condition." The partially formed opening is seen in several of my fossil specimens and is distinctly shewn in recent *B. philippinensis* and *Conescharellina elegans*, Waters, for specimens of which I am indebted to Mr. Whitelegge. It may be doubted whether the genus *Conescharellina* of D'Orbigny should not be adopted for our species, but as its true character may admit of some doubt I think it better to take the genus

proposed by Whitelegge. The species agree with Schizoporella in the structure of the thyrostome and I, therefore, include them in the same family.

1. *B. cancellata*, Busk, sp. Pl. XII., fig. 1.

Lunulites cancellata, Busk, B.M.C., II., p. 101; Waters, Q.J.G.S., 1882, pp. 257 and 512; *Bipora cancellata*, Whitelegge, Proc.L.S.N.S.W., 1887, p. 340; *Conescharellina cancellata*, Waters, A.M.N.H., Sept., 1887.

Zoarium small, conical, nearly plane below. Zoœcia alternate in rows radiating from the apex, surface raised round the thyrostome; thyrostome nearly semicircular, lower lip straight, with a small sinus below; peristome leaving a depression below the lower lip of the true thyrostome, a small pore on the upper lip; avicularia small, with semicircular or rounded mandibular opening, disposed between the zoœcia usually one on each side. Base of zoarium inside the marginal fringe of zoœcia cancellated.

B.

2. *B. philippinensis*, Busk, sp. Pl. XII., fig. 2.

Lunulites philippinensis, Busk, B.M.C. II., p. 101; *Bipora philippinensis*, Whitelegge, *l.c.*, 341.

Zoarium orbicular, raised in the centre. Zoœcia alternate in radiating series, raised round the thyrostome; thyrostome nearly semicircular with a rounded sinus in the lower lip; peristome leaving a space with straight lower edge below the under lip of the true thyrostome; avicularia small, rounded or elliptical with cross-bar for articulation of mandible; a small pit in upper lip. Base with central part inside zoœcial fringe flat, covered with round bullate elevations, perforated or having small avicularia similar to those on the front.

S.P.; M.C.

These two species are very closely allied and sometimes difficult to distinguish. In *B. cancellata* the zoarium is conical with a sharp apex, while in *B. philippinensis* it is much less elevated in the centre; the thyrostome differs a little, the space within the peristome below the lower lip being hollowed in its lower margin in the former, and in the latter wider and nearly straight across. The avicularia also differ, in the former having no distinct cross-bar for articulation, while in the other it is usually well marked. In my specimens of *L. cancellata* the lower surface of the zoarium is cancellated, possibly from the fracture of hollow elevations, while in *L. philippinensis* it is closely covered with small round bullate elevations, having numerous small avicularia. In both the supra-oral pore, although frequently well marked, is frequently indistinguishable.

Adeonella, *Busk.*

1. *A. triton*, n.sp. Pl. IX., fig. 23.

Zoœcia large, much elongated, distinct; surface smooth, with a row of large pores round the margin and extending above the thyrostome; thyrostome very lofty, arched above, narrowed downwards and hollowed below; an avicularium with long narrow mandible on one or both sides below the thyrostome, directed upwards and reaching to about the middle of its side. Oœcial cells very large; sides bordered by a row of very large pores; a slightly elevated area about the middle of the cell, with five or six pits or pores; aperture very wide, peristome very thin and raised, upper lip arched, lower projecting upwards; a narrow raised ridge or keel extending vertically from the middle of the lower lip to the perforated area; an avicularium on either side below the thyrostome directed slightly inwards and reaching nearly to the lower lip.

M.C.

The systematic position of this very peculiar species admits of great doubt. Its whole aspect closely resembles *Adeonellopsis*, with which it agrees in the structure and situation of the avicularia and of the large oœcial cells. The ordinary zoœcia, however, have no zoœcial pore or cluster of pores, and the cluster of pores or pits on the oœcial cell is raised and the pores themselves not stellate. The shape of the thyrostome also is different. On the whole, I think it ought to be referred to the Escharidæ, from the other genera of which it is differentiated by the oœcia being internal in modified cells, in the same way as Adeona and Adeonellopsis differ from the other Microporellidæ. I have only seen the one specimen.

Family Smittiidæ.

Zoarium crustaceous, or erect and uni- or bilaminate or dendroid. Zoœcia entirely calcareous, without membranous lamina or special pores; thyrostome variously shaped, entire (Rhynchopora) with a sinus below; a special development of the peristome forming the secondary orifice. Oœcia external.

Porella, *Gray.*

Zoœcia with the thyrostome subcircular; secondary orifice horseshoe-shaped or inversely triangular, with an avicularium within or on the edge of the peristome below.

1. *P. concinna*, Busk, sp. Pl. XII., figs. 6, 7.

Lepralia concinna, Busk, B.M.C., II., p. 67; *Porella concinna*, Hincks, B.M.P., 323.

Zoœcia ovate, distinct; a series of pores or deep areolæ round the margins, the rest of the surface usually smooth; thyrostome subtriangular, wider and slightly arched above, having a broad squared median denticle; peristome thickened and inclosing a small avicularium with broad rounded mandible; sometimes the avicularium much larger and extending down the zoœcium.

S.P.; M.C.; M. Living. Europe and North America and Australia.

In one of the Muddy Creek specimens the avicularian mandible is very large, much expanded inferiorly, and extends half way down the zoœcium. In the Moorabool specimens the zoœcia are larger and nearly quadrate, and the thyrostome is more rounded above.

2. *P. punctata*, n.sp. Pl. XII., figs. 8, 10, 11.

Zoœcia ovate, separated by narrow raised margins, surface depressed within the margins, convex, the part below the thyrostome raised and smooth, the rest with numerous small pores; thyrostome rounded above, contracted below; within the lower edge of the peristome a small avicularium.

B.; M.

In the Moorabool specimens the zoœcia are much wider and the margins more raised than in those from Bairnsdale. I am not quite certain if there is a median denticle. It may perhaps be a variety of *P. concinna*.

3. *P. flabellaris*, n.sp. Pl. XII., fig. 12.

Zoarium narrowly flabellate, bilaminate. Zoœcia elongated, narrow, convex, without raised margins; surface with numerous small round pores; thyrostome rounded above, contracted below, with a rounded sinus within which is an avicularium resting on a small squared denticle.

M.

Differs in the form of the thyrostome from the preceding, as well as the smaller size of the zoœcia and the erect, somewhat flabellate growth, which last, however, may not be constant.

4. *P. marsupium*, McG. Pl. XII., fig. 9.

Lepralia marsupium, McG., P.Z.V., 35; *Porella marsupium*, Hincks, A.M.N.H., 1881; McG., T.R.S.V., 1882.

Zoarium crustaceous. Zoœcia small, distinct, ovate, arranged more or less in linear series; surface smooth, minutely punctured or areolated at the margins;

thyrostome subcircular by the development of the peristome contracted downwards, with a squared denticle in the lower lip; several spines on the upper margin; a small avicularium in front of the denticle, on the upper part of a bullate projection occupying the portion of the zoœcium immediately below the thyrostome. Oœcia small, globular, smooth, with faint radiating lines.

M.C.; W.P. (W.) A common living Australian species.

5. *P. innocua*, n.sp. Pl. XII., fig. 13.

Zoœcia elongated, separated by narrow raised lines, with a row of long, narrow, deep areolæ along the margins, sometimes almost meeting in centre; thyrostome large, elongated, subquadrate, but rounded above, with a very large, deep, squared median denticle and a small acute one on each side; a small avicularium in the lower lip of the peristome. Oœcia small, depressed, punctured.

B.; M.

Smittia, *Hincks.*

Thyrostome semicircular, with a square denticle (lyrula) in the lower margin; secondary aperture elongated, the peristome raised on the sides and forming a spout-like channel below, in which is usually lodged an avicularium.

1. *S. transversa*, n.sp. Pl. XII., fig. 14.

Zoarium bilaminate. Zoœcia quadrate or hexagonal, separated by narrow raised lines, nearly flat, granular, especially in a line immediately within the margin, and with numerous small round perforations; thyrostome lofty, arched above, contracted below, with a deep rounded sinus in the lower lip formed by the projection of a denticle on each side; a broadly linear avicularium situated transversely immediately below the thyrostome. Oœcium large, convex, occupying greater part of the zoœcium on which it is placed, granular and punctured.

B.R.

2. *S. depressa*, n.sp. Pl. XII., fig. 15.

Zoœcia large, ovate; margins much thickened and raised, the junction of those of contiguous zoœcia indicated by a faint line; surface depressed, flat, with numerous large pores; thyrostome large, lofty, arched above, with a deep sinus, which is narrowed above and rounded at its extremity.

M.C.; B.

When the front wall is examined from behind, a small pointed median denticle is seen.

3. *S. cribraria*, McG. Pl. XII., figs, 16, 17.

Smittia cribraria, McG., T.R.S.V., 1885.

Zoarium encrusting. Zoœcia large, separated by narrow raised lines, slightly convex; surface with close-set rather large pores or deep pits; thyrostome large, with a round avicularium with the peristome below, in front of a large denticle.

M.C.

4. *S. ordinata*, n.sp. Pl. XII., figs. 18, 19.

Zoœcia ovate, alternate, in longitudinal series, separated laterally by deep furrows at the bottom of which is a narrow raised line from which branches extend to the middle of the thyrostomes; surface with numerous round pores; thyrostome somewhat pyriform with a rounded sinus below; a quadrate median denticle, having in front a small avicularium within the lower edge of the peristome. Oœcia small, rounded, subimmersed in the zoœcium above.

S.P.; M.C.; M.

5. *S. reticutata*, J. McG., sp. Pl. XII., figs. 20, 21.

Lepralia reticulata, Busk, B.M.C., II., 66; *Smittia reticulata*, Hincks, B.M.P., 346.

Zoarium crustaceous or unilaminate. Zoœcia elongated, separated by narrow raised lines with a row of large areolæ round the margins; surface smooth; thyrostome subcircular, with a quadrate median denticle and a small sharp one on each side; secondary orifice with a rather narrow and pointed or rounded sinus; several spines on the upper edge of the thyrostome; below the lower lip an avicularium with the long triangular mandible directed straight downwards.

Var. *calceolus*, McG., T.R.S.V., July, 1886. Oœcium much elongated, prominent, and frequently with a depression across the middle; its surface punctate with small or bordered pores, sometimes with a narrow smooth rim.

S.P.; M.C.; M. Living. Europe, Australia.

Var. *nitida*. Zoœcia narrower and more prominent; an avicularium, usually spatulate and of unequal sizes, on each side below the lower lip.

B.

In the well-known living European form the oœcia are semicircular and globose, prominent and punctured. In the usual living Australian form, as well as in the fossil, they are of the *calceolus* form, as shewn in fig. 21.

6. *S. intermedia*, n.sp.

Zoœcia elongated, separated by very fine raised lines, a row of large round pores along the margins; thyrostome rounded above, contracted below, and having a squared median denticle; four large spines on the upper edge; immediately below the lower lip a round pore which is probably avicularian. Immediately above the thyrostome is a circumscribed area, the front wall broken in the specimens, which is probably avicularian.

M.C.

7. *S. lateralis*, n.sp. Pl. XII., fig. 25.

Zoarium crustaceous. Zoœcia distinct, separated by narrow raised lines with a row of areolations close to the margins; thyrostome somewhat triangular, with a long spout-like sinus below; three spines above and a broad median denticle on the lower lip; on one side of the sinus a long raised avicularium extending half-way or more up the aperture and frequently obscuring the sinus, the mandible directed upwards. Oœcia globular, usually with two fenestræ or areolations.

B.; M.

A well marked and very interesting species.

8. *S. porinoides*, n.sp. Pl. XIII., fig. 1.

Zoarium bilaminate. Zoœcia very long, separated by distinct raised margins, convex, anterior surface with numerous small round pores; thyrostome nearly semicircular, the peristome raised, with a small spout-like sinus and a squared internal denticle; a distinct peristomial pore on each side close to the margin.

B.R.

9. *S. oculata*, McG. Pl. XII., fig. 22.

Smittia oculata, McG., T.R.S.V., July, 1882.

Zoarium crustaceous. Zoœcia elongated, separated by prominent raised margins; surface with large fenestræ or pores; thyrostome horseshoe-shaped or rounded; peristome forming secondary aperture much thickened; a median denticle in front of which is an avicularium of great size. Oœcia prominent, slightly granular or with a few (usually two) large pores.

S.P.

The above description has been taken from recent specimens.

10. *S. modesta*, n.sp. Pl. XII., fig. 23.

Zoœcia small, indistinct; surface with close-set round pores; thyrostome

pyriform, with a large median denticle; peristome much thickened, little elevated, smooth, forming a spout-like sinus below; no avicularia in the specimen.

B.

I have only a minute broken fragment from which it is impossible to be certain of the mode of growth, but I think it is bilaminate. There are no avicularia in the specimen, but there can be no doubt that it belongs to Smittia.

11. *S. bi-incisa*, Waters. Pl. XII., fig. 24.

Smittia bi-incisa, Waters, Q.J.G.S., 1882, p. 272.

Zoarium encrusting, zoœcia ovate, distinct, convex, with numerous large pores; thyrostome arched above, with about seven spines on the upper lip, lower lip with a prominent squared median denticle and a sharp triangular tooth on each side; on each side of the thyrostome frequently a thick tubular process surmounted by a rounded avicularium; and a prominence below the thyrostome also supporting an avicularium.

S.P.; M.C.

The lateral avicularia are frequently absent, as is also occasionally the suboral.

12. *S. latei*, Tenison Woods, sp. Pl. XII., figs. 26, 29.

Eschara latei, Tenison Woods, T.R.S.N.S.W., 1876, p. 149; *E. porrecta*, *id.*, *l.c.*, p. 147; *Smittia latei*, Waters, Q.J.G.S., 1881, p. 337; *id.*, 1882, p. 371.

Zoarium erect, bilaminate, branched and divided into narrow lobes or cylindrical. Zoœcia very long and narrow, of nearly uniform width throughout, with prominent raised margins having a narrow groove between those of contiguous series; a row of rounded pores down each side, frequently in a groove, and occasionally others between; thyrostome arched above with a sinus below, a squared median denticle and a small pointed tooth on either side; peristome usually becoming very much raised, projecting forwards and uniting across the upper part of the sinus so as to form a large peristomial pore; frequently a median avicularium below the thyrostome, with the long mandible directed vertically downwards. Oœcium small, rounded, punctate, with a raised surrounding rim.

S.P.; M.C.; B.

I was at first inclined to refer this species to Porina, from the presence of the suboral peristomial pore, but an examination from behind shewed in some zoœcia a median denticle and two small lateral teeth. The suboral pore is formed by the peristome sending a process forwards on each side, arching over the sinus and coalescing in the centre.

In the typical form there is a groove down each side of the front of the zoœcium containing the pores, which are comparatively small and irregular. Sometimes, instead of the two grooves, there are three, indistinct and irregularly united below. The aviculariun is narrow, and situated in a central depression.

In the form *porrecta* the margins are thicker, the front surface more regular and not grooved, and the pores large and uniform; the avicularia are large and frequently somewhat raised. It is by far the commonest form.

In a third form, *tubulosa*, from Bairnsdale, the peristome is much produced forwards so as to be almost tubular; the branches are much thinner, cylindrical, and having four or five zoœcial series. The zoœcia are proportionally much broader, wider at the middle opposite the thyrostomes of the zoœcia in the contiguous rows; the pores are numerous and indistinct; and the avicularia are very narrow and raised.

13. *S. areolata*, n.sp. Pl. XII., fig. 30.

Zoarium bilaminate. Zoœcia elongated, separated by slightly raised margins; a series of small, usually pointed arcolæ along the margins, directed inwards; thyrostome rounded above, contracted below, and with a narrow sinus in the lower lip, and inside a central squared denticle and two small lateral teeth; below the thyrostome a small, broadly elliptical aviculariun, with the mandible directed straight downwards.

S.P.

The internal denticles can only be distinctly seen when the anterior wall is viewed from behind. It may possibly be a form of *S. latei*, but I think it is a distinct species.

Cucullipora, *n.g.*

Zoarium erect, bilaminate. Zoœcia distinct, thyrostome lofty, oblique, arched above, straight below; peristome thickened and much raised, except on the lower lip, forming a strong cucullate projection above and on the sides; avicularia lateral by the side of the thyrostome, and with the sides raised somewhat like the peristome.

1. *C. tetrasticha*, n.sp. Pl. XIII., fig. 13.

Zoarium narrow, ligulate. Zoœcia distinct, alternate in two rows on each side of the zoarium; surface sulcate, finely granular and with numerous small perforations; thyrostome with a small deep denticle (not always visible) on either side; peristome rising abruptly on each side and much projecting forwards; an

avicularium on the outer side close to the thyrostome, the mandible pointed downwards and inwards, the sides much raised, and the whole forming a considerable projection; another small avicularium on a distinct elevation external to this and on a lower level.

S.P.; M.C.

In this very peculiar form the thyrostome is Lepralian, but the peristome is very much elevated and appears, owing to its deficiency below, like a short tube with a slice cut out of the lower side, the upper part having a hood-like appearance. The avicularia are arranged in a manner quite different from what is found elsewhere. There are two on the external side of the thyrostome. One is close to it and has its inner side incorporated with the peristome; the other is separated and situated externally, reaching close to the junction of the zoarial lamina. These external avicularia are arranged almost in a special tract, separated from the corresponding series of the other lamina by a slight ridge, those of the two series being opposite to each other.

Pachystomaria, *n.g.*

Zoarium unilaminate. Zoœcia broad above, narrowed below, oblique; surface cribriform; thyrostome rounded or elliptical; peristome much thickened, entire, and, as well as the portion of the zoœcium immediately below and to the sides, elevated; in the only species a large triangular avicularium to one side of the thyrostome.

1. *P. parvipuncta*, n.sp. Pl. VIII., fig. 24.

Zoœcia in obscurely radiating series, wide above, narrowed below; surface, except above, perforated by numerous small, close-set round pores, the margin forming a slightly thickened rim; upper part, immediately below and to the sides of the thyrostome and avicularium, raised, and with a few large irregular rounded or elongated pores; thyrostome transversely elliptical, the peristome much thickened; a large broad avicularium, with triangular mandible directed upwards and outwards, below and to one side of the thyrostome.

M.C.

Of this very interesting species I have only two incomplete but well-preserved specimens. They are both unilaminate, convex anteriorly and concave posteriorly. The zoœcia are arranged in an irregularly radiating manner. In one specimen the dorsal surface is formed by radiating series of convex ridges, with a few pores or pits contracted at intervals and separated by deep grooves, exactly similar to the structure found in many species of Selenaria and Lunulites. In the other the

radiate arrangement is not so distinct. Part of each is the growing edge, and they are both evidently segments of an orbicular or expanded zoarium, probably free as in the genera mentioned. The structure of the zoœcia, however, is totally different. The pores in the front wall are small, closely and irregularly placed, and not formed in the same way as those of Cribrilina. The large pores in the neighbourhood of the thyrostome and avicularium are depressions or openings between buttress-like outgrowths from the elevated margins of these structures. The avicularium is of great size, situated to the side of and a little below the thyrostome, and occupying an equal extent of the width of the zoœcium.

Phylactella, *Hincks.*

Thyrostome more or less circular; peristome usually deficient above, much elevated below and on the sides, not chanelled or sinuated.

1. *P. porosa*, n.sp. Pl. XIII., fig. 2.

Zoarium encrusting. Zoœcia distinct, broad, convex; surface with numerous small round pores, except below the thyrostome; thyrostome large, arched above, no denticles on the lower lip, peristome of lower lip and sides thick, and forming a much-projecting entire semicircular collar extending downwards as a raised triangular prolongation.

M.

Allied to the European *P. labrosa*, but differing in the lower lip being very thick, without any denticle, and forming a perfect semicircle, as well as in the triangular prolongation downwards.

I have another species from Bairnsdale, but the specimens are too imperfect for satisfactory description.

Mucronella, *Hincks.*

Thyrostome semicircular or subcircular, the peristome of the lower lip elevated into a projecting process or mucro.

1. *M. præstans*, Hincks. Pl. XIII., fig. 6.

Mucronella præstans, Hincks, A.M.N.H., Aug., 1882.

Zoarium encrusting or bilaminate. Zoœcia distinct, elongated, projecting slightly above; surface smooth or slightly fibrillated, a row of deep elongated areolæ directed inwards round the margins; thyrostome subcircular, peristome prolonged in

front, frequently in a neck-like manner, and supporting a small mucro; upper lip depressed, with four straight spines (seldom visible in the fossils); an avicularium directed outwards on one or both sides of the projecting peristome on a raised process, the base of which has three or four pores, the large spatulate avicularium opening upwards and forwards. Oœcium rounded, usually contracted below, raised in the centre and surrounded by a row of deep converging areolæ.

S.P.; M.C.; B.; M. Living. Australia and New Zealand.

2. *M. lata*, n.sp. Pl. XIII., fig. 3.

Zoarium crustaceous. Zoœcia broadly ovate, moderately convex, separated by narrow raised lines or grooves, obscurely granular, with a few small round pores close to the margins; thyrostome arched above, slightly contracted opposite the angles of the mucro; mucro large, broad, straight and expanded above, the angles being produced laterally; four spines articulated above; occasionally a large spatulate avicularium directed upwards by the side of the thyrostome. Oœcium small, rounded.

S.P.; C.B.

3. *M. spongiosa*, n.sp. Pl. XIII., fig. 8.

Zoarium bilaminate. Zoœcia indistinct, entirely occupied by close, irregularly-shaped pores, giving the whole a cancellated honeycombed appearance; thyrostome crescentic with rounded angles, the lower lip projecting upwards as a wide shallow mucro.

M.

A single small fragment, which seems to be part of a rather narrow rounded branch.

4. *M. teres*, Hincks. Pl. XIII., fig. 7.

Mucronella teres, Hincks, A.M.N.H., Aug., 1881; *M. lævis*, McG., P.Z.V., 116.

Zoarium encrusting. Zoœcia distinct, ovate, convex, smooth, a row of small areolations round the margins; thyrostome arched above, lower lip with a small acute mucro pointing upwards, six spines on the upper edge. Oœcia small, round, smooth, two or three spines on each side in front.

M.C. Living. Australia.

I now believe that *M. teres* and *M. lævis* are the same species.

5. *? M. cultur*, Hincks. Pl. XIII., fig. 4.

Mucronella cultur, Hincks, A.M.N.H., 5, X., sep. 98. McG., P.Z.V., 116.

I have a small fragment from Moorabool which I refer very doubtfully to this

species. The zoœcia are large, elongated, convex, granular and porous; the thyrostome is large, wide, arched above, contracted below; peristome thickened on the sides and below, and raised in the centre into a thick pointed mucro, on one side of which is a large avicularium.

M.

6. *M. mooraboolensis*, n.sp. Pl. XIII., fig. 9.

Zoarium encrusting. Zoœcia irregularly arranged, ovate, distinct, prominent, especially above; thyrostome large, arched above, lower lip straight and without a sinus, with growth projecting forwards so as to form a broad rounded mucro; 6-8 spines on the upper lip; a vibracular pore on an elevation on one or both sides of the thyrostome.

M.

I am doubtful where to refer this species. The vibraculum is similar to that of *Mastigophora*, but there is no sinus.

7. *M. apiculata*, n.sp. Pl. XIII., fig. 5.

Zoarium encrusting. Zoœcia elongated, distinct convex, surface with small pores; thyrostome rounded above, slightly hollowed below with a sharp mucro from immediately below the lower lip, projecting upwards and forwards and with an avicularium on one side. Oœcia large, rounded, prominent.

B.

Allied to *M. porosa*, Hincks.

Bracebridgia, *McG.*

Zoarium bilaminate, erect. Thyrostome subcircular, straighter below, with an internal denticle; peristome thickened, smooth or with a small apiculate mucro; frequently in the fossils, but rarely in recent specimens, a triangular avicularium immediately below the lower lip; lateral avicularia on the free edges of the zoarium.

1. *B. emendata*, Waters, sp. Pl. XIII., figs. 10, 11.

Porella emendata, Waters, Q.J.G.S., 1881, p. 336; *Mucronella pyriformis*, Busk, C.P., Pt. I., 155; *Bracebridgia pyriformis*, McG., P.Z.V., 158.

Zoarium forming branching lobes. Zoœcia expanded above, narrowed below, a row of pores in a furrow down each side and occasionally others on the front; a tumid band embracing the upper part of the thyrostome, the two sides uniting below the lower lip and continuing downwards as a central elevation; thyrostome

nearly straight below, with a bread internal denticle and occasionally an apiculate mucro; on or immediately below the lower lip a small oblique avicularium (frequently absent); a few small avicularia with triangular mandibles on the free edge of the zoarium.

M.C.; B.R.; C.C. (W.). Living. Australia.

The avicularium is present in almost all the zoœcia of some of the fossils, while in others it is mostly absent as in recent specimens where it is very seldom seen. The surface of recent specimens is covered with a glistening epitheca and the pores are scarcely visible without incineration. It is allied to both Mucronella and Porella, but I think is properly made the type of a distinct genus.

When describing it in T.R.S.V. and P.Z.V., I had not recognised its identity with *Porella emendata* of Waters, whose specific name must take priority over that of Busk.

Rhynchopora, *Hincks.*

Zoarium encrusting. Thyrostome rounded above, the lower lip straight and entire or with a slight sinus; an uncinate process on the edge of or within the lower lip, and below it a prominent mucro.

1. *R. bispinosa*, Johnston, sp. Pl. XIII., fig. 16.

I believe the specimen figured to belong to this very variable species, which occurs living in Europe and Australia. Full descriptions will be found in B.M.P. and P.Z.V.

M.C.

2. *R. longirostris*, Hincks. Pl. XIII., figs. 17, 18.

Rhynchopora longirostris, Hincks, A.M.N.H., Aug., 1881; McG., P.Z.V., 196; *R. profunda*, McG., T.R.S.V., Oct., 1881, P.Z.V., 196.

Zoœcia large, broadly ovate, frequently with a row of pores on the margins; surface smooth or in older zoœcia granular; thyrostome wide, lower lip entire; an uncinate process becoming developed on one side and a prominent mucro below it.

M.C.

The few specimens I have seen seem to be mostly from the growing edges of colonies, and do not shew the fully formed zoœcia, none of them having the characteristic large avicularia of the recent specimens, although a few small ones are present. Full description from recent specimens will be found in P.Z.V.

3. *R. spinifera*, n.sp. Pl. XIII., fig. 19.

Zoarium encrusting. Zoœcia broadly ovate or subcircular; thyrostome large with about eight spines on the upper margin, lower lip in young zoœcia straight, in older with a large process rising from one side and curved over towards the opposite, which it nearly meets but leaves a narrow inclosed sinus; in many zoœcia on one side of the thyrostome a round avicularium or vibracular pore on a slight eminence.

M.

Aspidostoma, *Hincks.*

Zoarium bilaminate, expanded and foliaceous. Zoœcia with the sides tumid, especially in the upper part; thyrostome at the summit of the zoœcium, partly concealed by the tumid border, arched above, straight below, and protected in front by a broad, shield-like plate or mucro which is continued downwards for some distance within the zoœcium.

1. *A. crassum*, Hincks. Pl. XIII., fig. 12.

Aspidostoma crassum, Hincks, A.M.N.H., Feb., 1881; *? Eschara gigantea*, Busk, B.M.C., Pt. II., p. 91; *A. giganteum, id.*, C.P., Pt. I., p. 161.

Zoarium expanded, forming foliaceous expansions contracted towards the base. Zoœcia large, ovate or pyriform, separated by grooves, dense sides, especially above, tumid, the front depressed below the thyrostome, but with a central tumid ridge extending for a short distance downwards; thyrostome arched above, straight below, the lower edge with a broad squared plate, with a thickened margin extending to the sides of the aperture, between which and the plate it forms a loop-shaped notch. Oœcia elongated, depressed and flat, minutely granular.

W.P. Living between Patagonia and Falkland Islands (Hincks); Patagonia and Tristan da Cunha (Busk).

Hincks describes the margin of the hood-like border overarching the thyrostome as rising into two pointed processes with a narrow cleft between. These are not seen in my specimens, although in some of the zoœcia there is a slight projection on each side which probably represents them worn off. He also describes an avicularium (absent in the fossils) leaning against the side of many of the zoœcia a little below the upper extremity. Otherwise the recent and fossil forms entirely agree. Busk considered his own and Hincks' species as identical, but as that admits of some doubt, I have retained the specific name given by Hincks.

Porina, *D'Orbigny.*

Zoarium encrusting or erect and uni- or bilaminate or cylindrical. Zoœcia with the thyrostome subcircular, the peristome produced and having one or more suboral pores opening into its cavity above the operculum.

The essential character of this genus is the presence of one or more suboral pores opening into the peristomial chamber in front of the operculum, and so differing from the special pores of the Microporellidæ, which open into the body cavity.

1. *P. gracilis*, Milne Edwards, sp. Pl. XIV., figs. 21-24.

Eschara gracilis, Milne Edwards, Sur les Eschares, p. 28; Busk, B.M.C., II., 91; C.P., Pt. I., 141; McG., P.Z.V., 48; *Cellaria coronata*, Reuss, Foss. Polyp. der Wien. Tert., p. 62; *Porina coronata*, Waters, Q.J.G.S., 1881, p. 333; *Spiroporina vertebralis*, Stoliczka, Foss. Bryoz. der Orakei Bay, p. 106; *Porina Dieffenbachiana*, *id.*, p. 135; *Leptobothrus spenceri*, T. S. Hall, T.R.S.V., Oct., 1892, described as a Stylasterid.

Zoarium encrusting, lobed and bilaminate, or cylindrical. Zoœcia mostly indistinct in the crustaceous and lobed form, more distinct in the cylindrical, surface closely pitted; thyrostome circular or wider than high; peristome thickened and slightly raised, or much elongated and tubular, in both cases with a circle of small, round, frequently elevated avicularia on its free edge; peristomial pore immediately below the thyrostome or a short distance down the zoarium; small avicularia similar to those round the thyrostome scattered irregularly over the zoarium, and occasionally a few large spatulate ones.

The following varieties may be indicated, taking the lobed form as the typical:—

Var. (*a*) *dieffenbachiana*, Stol. Branches cylindrical; zoœcia irregularly arranged.

Var. (*b*) *vertebralis*, Stol. Branches cylindrical; zoœcia arranged verticillately.

Var. (*c*) *tubulifera*. Branches cylindrical, slender; zoœcia with the peristome much produced and tubular.

S.P.; M.C.; B.; C.B.; Belm.; M.; C.C. (W.) A common living Australian species.

The lobate form is that usually found recent, while the great majority of the fossil specimens are cylindrical.

2. *P. cribraria*, n.sp. Pl. XIV., fig. 25.

Zoarium cylindrical. Zoœcia large, alternate in longitudinal series, separated laterally by distinct raised margins, elongated, quadrate; surface convex, with numerous rounded deep pits; thyrostome arched above, nearly straight below, peristome thickened; a large rounded peristomial pore below the lower lip; a large sessile avicularium on each side of the thyrostome, with the triangular mandible directed inwards and the rostrum incorporated at its extremity with the peristome.

S.P.; B.

A very handsome and distinct species.

3. *P. larralis*, McG. Pl. XIV., fig. 26.

Lepralia larralis, McG., P.Z.V., 37; *Porina larralis*, Waters, Q.J.G.S., 1882, p. 509.

Zoarium encrusting. Zoœcia indistinct, surface entirely occupied by large round pores; thyrostome large, semicircular, straight below, with a large spine articulated close to each angle; peristome below much developed and forming a large pointed mucro, with two large peristomial pores, separated by a thickened vertical ridge, and having a similar ridge on the outside of each; avicularia (not always present) large, with triangular mandibles, below or to the side of the peristomial pores.

M.; B. (W.) Living. Australia.

In recent specimens there is usually a thick epitheca covering the front of the zoœcia, but not closing the peristomial pores.

I place this species in Porina on account of the situation of the large suboral openings, but am not quite satisfied as to the propriety of doing so. It may possibly prove to be a Hiantopora.

Family Tubucellariidæ.

Zoarium erect, branched, branches cylindrical. Zoœcia arranged around an imaginary axis, convex, distinct; thyrostome produced into a tubular peristome. No avicularia.

Tubucellaria, *D'Orbigny.*

Zoarium consisting of cylindrical internodes, connected by corneous tubes. Zoœcia ventricose above and attenuated downwards; usually a simple circular median pore; surface punctuate, porous or reticulate.

1. *T. cereoides*, Ellis and Solander. Pl. IV., fig. 1.

Cellaria cereoides, E. and S., Zoophytes, 26; Lamouroux, P.C.F., 127; *Tubucellaria cereoides*, MeG., T.R.S.V., Nov., 1884; *id.*, P.Z.V., 18.

Zoœcia ovate; surface pitted; thyrostome subcircular, straighter below, peristome thickened and turned forwards, its outer surface obscurely grooved and surrounded at the base by a raised line.

Var. *areolata* (fig.) Zoœcia much elongated, separated by narrow raised lines, depressions or areolæ on surface much elongated.

M.C.; M. Recent.

The specimens which I have of the normal are very fragmentary, and, although sufficient for identification, are scarcely perfect enough for figuring. The var. *areolata*, from Muddy Creek, has the zoœcia much elongated, and the pits or areolæ are very much elongated. It might be advisable to consider it as a distinct species, but I think not.

2. *T. marginata*, n.sp. Pl. IV., figs. 2, 3.

Zoœcia ovate, flattened in front, with distinct raised margins; surface thickly covered with large, round, elevated pores; thyrostome with the peristome thick, much raised, projecting forwards at nearly a right angle, its outer surface granular. No special zoœcial pore.

S.P.; M.C.

The zoœcia are bordered by distinct raised margins, those of contiguous zoœcia being separated by a narrow groove. The pores are raised and tubular. In the most perfect peristomes the edge is slightly expanded, everted and sinuous.

Family Prostomariidæ.

Zoarium erect, branched. Zoœcia uniserial, alternate, cylindrical, opening on one aspect forwards and outwards, posterior surface separated from the anterior by a narrow raised line; peristome much produced.

Prostomaria, *n.g.*

Characters as for the family.

1. *P. gibbericollis*, n.sp. Pl. III., fig. 28.

Each zoœcium arising from the posterior and lateral part of the preceding by a broad base, the upper part turned forwards; anterior surface finely punctate, with small bordered pores; thyrostome with the peristome much produced, forming a

broad tumid ring contracting towards the orifice, which is again slightly produced and lacerated or obscurely bilabiate. Posterior surface finely granular.

S.P.; M.C.

The lines separating the anterior from the posterior surface of the zoœcia are not quite lateral but somewhat posterior. They are not quite continuous throughout the length of the zoarium, rising from the posterior part of the peristome and extending, but gradually becoming thinner to the base of the zoœcium. These lines a good deal resemble the vibices of Retepora, and the character of the surfaces is different, as in that genus. They, however, do not spread or divide, but are quite regular, simply separating the two aspects. Otherwise, there is no affinity between the genera. There can, I think, be no doubt of the propriety of establishing a new family for the reception of this species, its nearest allies being the Tubucellariidæ.

Family Bitectiporidæ.

Bitectipora, *n.g.*

B. lineata, n.sp. Pl. XIII., fig. 20.

(For description see Appendix.)

Family Celleporidæ.

Zoarium encrusting or more or less free and uni- or bilaminate, or dendroid, or forming clustered masses. Zoœcia (adult) urceolate, irregularly heaped together, the upper parts being free; thyrostome terminal, subcircular, or with a straight or hollowed lip, with or without a sinus.

Lekythopora, *McG.*

Zoœcia flask-shaped or elongated, oblique or erect and crowded; primary thyrostome with a deep notch in the lower lip and a small avicularium at one side; peristome becoming produced into a long tubular orifice, on one side of the margin of which is the avicularium connected with its original position by a minute semi-spiral tube. Oœcia projecting from the front of the zoœcia below the thyrostome, covered by a chitinous or subcalcareous plate.

1. *L. hystrix*, McG. Pl. XIV., figs. 1, 2.

Lekythopora hystrix, McG., P.Z.V., 156; Waters, Q.J.G.S., 1885, p. 308.

S.P.; M.C.; B.; C.B.; M. Living. Australia.

This is a common Australian living species, forming small, simple or branched clusters on other calcareous polyzoa, mostly Adeona and Hornera. The zoœcia are much confused, oblique or erect, usually smooth, and with a few round pores. The oral avicularium is not always present even in recent specimens. It is originally situated at the side of the primary thyrostome, and as the peristome is developed it is carried upwards in a semispiral manner, its course being usually marked by a slender tube. The oœcium forms an enlargement on the front of the zoœcium, the most prominent part being closed by a disk-shaped convex membrane, chitinous, and becoming calcareous with age in recent specimens, in the fossils calcareous, and usually marked with concentric grooves or pores.

Cellepora, *Fabricius.*

Zoarium crustaceous, adnate, or glomerulous, or foliaceous and partly free, or erect and ramose. Zoœcia, in the crustaceous and foliaceous forms, erect and confused in the central parts, decumbent at the growing edges; thyrostome with the lower lip entire; one or more rostral processes (frequently absent), usually bearing avicularia in the neighbourhood of the thyrostome; other scattered avicularia of various forms.

1. *C. abdita*, n.sp. Pl. XIV., fig. 3.

Zoarium encrusting. Zoœcia rounded, erect, bases confluent, surface smooth or slightly granular; thyrostome large, subcircular, peristome not thickened or produced; no avicularia or rostra in the specimens seen. Oœcia hemispherical, immediately below the thyrostome, with no visible external opening, surface with fine striæ radiating from opposite the middle of the lower lip. There are occasionally a few small pores towards the margins of the zoœcia, and others, mostly larger, between them. Some of the latter may possibly be avicularian, but I think not.

S.P.

I refer this species doubtfully to Cellepora, and it might perhaps be advisable to found a new genus for its reception, characterised by the subcircular thyrostome, destitute of peristome, and the absence of rostra or oral avicularia.

2. *C. trideniiculata*, Busk. Pl. XIV., figs. 4, 5, 6.

Cellepora trideniiculata, Busk, C.P., Pt. I., p. 198; McG., P.Z.V., 128.

Zoarium small, encrusting. Zoœcia irregularly arranged, confused; thyrostome arched above, straight below, with three, or occasionally four, quadrate denticles on the lower lip; 2-4 spines articulated above; a small avicularium, usually on a raised process, below the mouth.

S.P.; M.C.; B.; C.B. Living. Australia.

The specimens are not in a very good condition, and only a few of the zoœcia shew the marks of the oral spines. The one shewn in fig. 5 I was at first inclined to refer to a different species, but I think it is only an early stage. In some of its zoœcia there is a row of 6-8 spines on the upper edge of the thyrostome. In most there is no appearance of the internal denticles, but in one they are present.

Var. *nummularia*, Busk. Pl. XIV., figs. 6, 6*a*, 6*b*, 6*c*, Tenison Woods, T.R.S.V., 1861, p. 3; *C. tridenticulata*, Waters, Q.J.G.S., 1885, p. 306.

In this variety the zoarium is discoid or dome-shaped, 10-20 millimetres in diameter, and is formed of several superposed layers of zoœcia. The overlapping of these is marked on the under surface by concentric rings, the zoœcia themselves being distinct and arranged in regular radiating series. In some of the largest specimens the posterior surface is very concave, and the zoarium has the appearance of that of a large Lunulites. In others, mostly smaller, the posterior surface is convex, the whole zoarium being proportionately thicker and dome-shaped.

S.P; B.R.; C.B.; G.

3. *C. fossa*, Haswell, sp. Pl. XIV., figs. 8, 9, 10.

Sphærophora fossa, Haswell, Proc. Linn. Soc. N.S.W., Vol. V., 42; *Cellepora fossa*, Waters, Q.J.G.S., 1881, p. 343; 1885, 307.

Zoarium small, about five millimeters diameter, lenticular, more convex on one side; in most specimens, on one side, one or more small deep round pits. Zoœcia confused, projecting forwards, rounded; thyrostome arched above, straight and entire below; a rounded avicularium on an elevation immediately below the thyrostome.

S.P.; B.R.; C.B.; W.P.; C.C. (W.).

In most specimens there is a single pit on one side near the centre, in others there are several, and occasionally they are absent. The suboral elevation is mostly broken open, when it forms with the thyrostome a single large aperture divided by a narrow cross-bar. In one specimen it is in most of the zoœcia produced into a slightly elevated conical process with a small opening, evidently avicularian, at the summit.

4. *C. serrata*, n.sp. Pl. XIV., fig. 7.

Zoarium circular, convex above, flat or hollowed below, with a central pit on the under surface. Zoœcia irregularly arranged, rounded, surface granular; thyrostome arched above, contracted below; lower lip straight, with about six short,

squared denticles; a large, rounded elevation extending downwards from the lower lip and having a semicircular avicularium opening upwards.

B.R., Mr. Hall.

This is allied to the last species, from which it differs in the internal denticles on the lower lip and the larger size and more regular form of the suboral elevation; the avicularium also is different and opens upwards on the margin of the lower lip resembling that of some species of Porella.

5. *C. albirostris*, Smitt, sp. Pl. XIV., fig. 11.

Discopora albirostris, Smitt, Floridan Bryozoa, Pt. II., p. 70; *Cellepora albirostris*, Busk, C.P., Pt. I., p. 193; Waters, Q.J.G.S., 1885, p. 304.

I have two or three specimens from Schnapper Point, one of the best of which is figured. A full description will be found in P.Z.V. It occurs living in the Gulf of Florida and Australia and was got by the "Challenger" Expedition off Heard Island.

Schismopora, *McG.*

Characters as for Cellepora, except that the thyrostome has a sinus in the lower lip.

1. *S. costata*, McG. Pl. XIV., fig. 12.

Cellepora costata, McG., P.Z.V., 148; Waters, Q.J.G.S., 1885, p. 303; 1887, p. 68.

Zoarium encrusting, or forming small masses adhering to algæ or other bodies. Zoœcia large, very irregular, mostly erect, surface strongly ribbed; thyrostome lofty, arched above, with a deep, rounded sinus in the lower lip; a stout, thick process from the peristome on each side, surmounted by a conspicuous avicularium.

M.C.; B.; C.B.; M. A common living Australian species.

In good specimens the surface is beautifully fluted with prominent convex ribs extending nearly the whole length of the zoœcia and frequently thickened above. The processes supporting the oral avicularia vary in size, being usually very prominent, but occasionally the avicularia are almost sessile. There are also in many specimens large scattered spatulate vicarious avicularia. None of the fossils have oœcia. In recent specimens they are of considerable size, extending nearly horizontally from the upper edge of the thyrostome, rounded, occasionally smooth, but usually with a sculptured area.

2. *S. modesta*, n.sp. Pl. XIV., fig. 13.

Zoarium small, encrusting. Zoœcia at the margins decumbent, confused and

erect in the central parts, smooth; thyrostome subcircular, with a conspicuous rounded sinus in the lower lip; the margins thick and tumid.

M.C.

I have great doubt whether this may not be really identical with *C. costazei*. The specimens are all small. In some of the zoœcia the peristome is a little more prominent on each side; there is, however, no appearance of avicularia in any of the specimens.

3. *S. costazei*, Audouin.

Cellepora hassallii (Johnston), Busk, B.M.C., Pt. II., p. 86; *C. costazei*, Hincks, B.M.P., 411; McG., P.Z.V., 148.

Of this I have only two or three specimens too imperfect for description or illustration, but still sufficient to leave no doubt of the identification.

B.; M. A living Australian and European species.

4. *S. granum*, Hincks. Pl. XIV., fig. 14.

Cellepora granum, Hincks, A.M.N.H., Aug., 1881; Busk, C.P., 205; Waters, Q.J.G.S., 1883, p. 440; A.M.N.H., Sept., 1887.

Zoarium small. Zoœcia ovate, distinct at the margins, confused and erect in the central parts; thyrostome rounded, with a distinct narrow sinus in the lower lip; peristome produced above to form a lofty mucro having a small ovate avicularium on the inner aspect at the apex, and rising on each side into a point. Oœcium situated below the thyrostome, projecting, rounded, with a semicircular space in front, bounded by a distinct border and traversed by converging grooves.

M.C. (W.); B. Living. Australia.

5. *S. incus*, n.sp. Pl. XIV., fig. 15.

Zoarium massive, lobed, in the specimen figured anvil-shaped. Zoœcia confused, indistinct, immersed, surface finely granular; thyrostome opening straight forwards, arched above, lower lip with a wide sinus, a sharp internal denticle on each side; scattered rounded avicularia, on elevations, interspersed among the zoœcia.

S.P.

There are specimens of several other species of Cellepora and Schismopora, but in too imperfect a condition for certain identification or description in so difficult a genus. Among them are, I believe, *C. intermedia* (McG.) and *C. coronopus* (S. Wood).

Family Reteporidæ.

Zoarium calcareous, erect, foliaceous, fenestrate, reticulate or ramose, originating from a contracted base. Zoœcia oblique, closely united or immersed, indistinct posteriorly.

Retepora, *Imperato.*

Zoarium usually fenestrate or reticulate, rarely simply branched; posterior surface vibicate.

1. *R. beaniana*, King. Pl. XV., figs. 7, 8.

R. beaniana, Busk, B.M.C., Pt. II., 94; Crag. Pol., 75; Hincks, B.M.P., 391; Waters, Q.J.G.S., 1883, 349.

Zoarium fenestrate. Zoœcia separated by narrow raised lines, ovate, slightly convex, projecting slightly forwards above; surface smooth or with irregular small depressions; thyrostome arched above, straight below, each side of the peristome forming an acute process; an elevation on the lower lip surmounted by a nearly circular avicularium, the semicircular mandible directed downwards and forwards, the upper edge of the avicularium produced into a sharp spine; on the front of the zoœcia, towards the upper part, frequently an elliptical avicularium, with the mandible pointed straight or obliquely downwards. Dorsal surface divided angularly by sharp vibices, smooth, and with scattered elliptical avicularia.

S.P. Recent Europe. Crag., England.

This species, although well known in Europe, has not as yet been found living in Australia.

2. *R. fissa*, McG. Pl. XV., figs. 9, 10.

R. fissa, McG., T.R.S.V., 1869; *id.*, P.Z.V., p. 95; *R. marsupiata*, Smitt, Floridan Bryozoa, Pt. II., 67; Waters, Q.J.G.S., 1881, 342; *id.*, var. *mucronata*, *l.c.*, 1883, 439.

Zoarium fenestrate. Zoœcia elongated, rhomboidal or ovate, separated by distinct raised margins; thyrostome (primary) hollowed or straight below, the peristome largely developed; the secondary aperture projecting upwards and forwards, a slight sinus in lower lip, from which extends downwards a narrow groove, frequently closed in front, especially in the lower part, to form a tube; at the end of this groove or tube frequently a small pore; an avicularium to one side or below the extremity of the groove, with the mandible directed straight or obliquely downwards; occasionally other avicularia on the front of the zoœcia. Oœcium rounded, with a vertical slit wider above. Dorsal surface divided by narrow vibices, smooth or finely granular, and occasionally with a few scattered avicularia.

S.P.; M.C.; B.; C.B. Recorded by Waters also from S.W. Victoria, Mt. Gambier, and Aldinga. Recent Florida and Australia.

In the typical form this is a well-marked species. The much-produced peristome has a long narrow groove extending downwards, frequently closed over in whole or in part to form a tube, in which case there may be another slight groove on each side; in many instances there is a small pore at its termination. The avicularium varies much. It is mostly situated on a considerable elevation, the mandible, frequently of considerable size, directed obliquely or straight downwards; sometimes it is quite small, with the mandible rounded. In many zoœcia it is altogether wanting. Waters' var. *mucronata* has a large oval avicularium below the thyrostome, and above this the peristome rising into a mucro. It has a considerable resemblance to *R. aciculifera*, but Waters figures the characteristic oœcia of *R. fissa*.

Var. *insignis*.

Zoœcia broad, flat, of nearly uniform width, with a narrow raised margin; lower lip of thyrostome widely hollowed, the angles pointed, and with a small sinus; frequently two small pores inferiorly; no avicularia.

S.P.; M.C.; B.

Var. *hexagona* (fig. 9).

Zoœcia broad, flat, hexagonal, with narrow raised margins; peristome much produced; lower lip with a small sinus from which extends a short ridge or tube.

M.C.

3. *R. aciculifera*, n.sp. Pl. XV., figs. 2, 3, 4.

Zoarium fenestrate. Zoœcia ovate, smooth, separated by distinct raised lines; thyrostome with a sharp aciculate mucro in the centre of the lower lip and a slightly raised process on either side; immediately below this a long raised sessile triangular avicularium (occasionally absent), with the mandible pointing downwards and reaching to the middle of the zoœcium; below this avicularium a small round pore. Oœcia elongated, little prominent, smooth above or with a small fissure, grooved below, and the lower margin forming a broad plate with a rounded notch on each side. Dorsal surface smooth, with irregular raised vibices and a few ovate avicularia.

S.P.

4. *R. rimata*, Waters. Pl. XV., figs. 12, 13.

R. rimata, Waters, Q.J.G.S., 1881, 343.

Zoarium probably fenestrate, trabeculæ narrow. Zoœcia elongated, narrowed below, separated by narrow raised lines; peristome projecting forwards with a

vertical fissure extending its whole length, forming a large prominence on each side, with the inner margin turned backwards especially towards the base of the sinus; the peristome frequently surrounded by a narrow raised line. A small avicularium below the thyrostome with the broad mandible pointed downwards, and below that a small pore (both frequently absent). Dorsal surface divided into areas, angular above and below, separated by narrow raised vibices, smooth, with numerous small nodular elevations and a few small pores; scattered immersed elliptical avicularia, with the mandible expanded and sometimes almost spatulate.

S.P.; M.C.; B.; C.B.

Distinguished by the lofty peristome bulging on each side of the median fissure, and by the elongated noduliferous areas on the back of the zoarium.

5. *R. avicularis*, McG.

R. avicularis, McG., T.R.S.V., 1882; P.Z.V., 94, 95.

Zoarium fenestrate; fenestræ elongated, wider than the narrow trabeculæ. Zoœcia ovate, separated by narrow raised margins; thyrostome with a small sinus in the lower lip, the angles on each side of the sinus produced into a sharp point; on the front of the zoœcium a large bullate elevation supporting an avicularium, and frequently a small elliptical avicularium to one side; several small pores on the front of the zoœcia. Dorsal surface strongly vibicate, with a few avicularia.

S.P. Recent Victoria.

I have only a single specimen, which seems referable to *R. avicularis*. In the recent specimens there is a long spine on each side of the thyrostome. In the fossil the processes on the sides of the sinus are not so distinct and the spines are only shewn on one or two of the zoœcia. In the recent form there are no anterior avicularia except those on the bullate elevations. There are no oœcia in the fossil specimen, in the recent they are rounded and entire. I have little doubt, however, of the identification.

6. *R. schnapperensis*, n.sp. Pl. XV., fig. 6.

Zoarium fenestrate. Zoœcia wider in the middle, separated by prominent raised lines; thyrostome nearly circular, with a small rounded notch in the lower lip, and two or three spines (usually absent) above; peristome thickened all round, more produced at the sides; an avicularium about the middle of the zoœcium. Dorsal surface smooth, with raised vibices; an avicularium usually towards the inferior part of each area.

S.P.; B.

7. *R. tessellata*, var. *benemunita*, Hincks. Pl. XV., fig. 11.

R. tessellata, Hincks, A.M.N.H., May, 1878; McG., P.Z.V., 99.

I have a small, not very well-preserved fragment of a specimen which ought probably to be referred to this species. The zoœcia are irregularly shaped, broad and rounded above, contracted below, with narrow raised margins; the thyrostome arched above, straight below, with a small elliptical avicularium placed transversely on a slight elevation on the lower lip; the marginal zoœcia with several spines; a large immersed avicularium, with long triangular mandible, placed transversely across the zoœcium a little above the middle, and a few other minute avicularia irregularly situated. Dorsal surface mapped into distinct areas, separated by narrow sharp vibices and each containing one or more large avicularia similar to those on the front of the zoœcia.

The specimen does not shew the thyrostome very clearly, but, so far as can be made out, the upper angles of the zoœcia at the sides are not produced and elevated as in the recent form, in which also there is no oral avicularium.

S.P.

8. *R. permunita*, n.sp. Pl. XV., figs. 17, 18.

Zoarium fenestrate; fenestræ small, elliptical, about the same width as the trabeculæ. Zoœcia elongated, separated by narrow raised lines; thyrostome in central zoœcia with a distinct round sinus in the lower lip, in the lateral zoœcia the peristome produced, especially to one side, and lacerated or serrated for spines; a few scattered avicularia on the front of the zoœcia on large mound-like elevations. Oœcia rounded, convex, smooth, entire and subimmersed. Dorsal surface smooth, divided into angular spaces by well-defined vibices; numerous rounded or elliptical avicularia in the spaces; and on the margins of the fenestræ a series of large avicularia, the fenestral extremity of which is raised and the mandible directed away from the fenestræ.

M.C.

Readily distinguished by the peculiar arrangement of the dorsal avicularia.

9. *R. monilifera*, McG.

R. monilifera, McG., T.R.S.V., 1859 and 1883; P.Z.V., 96, 97.

Zoarium fenestrate; fenestræ oval, small, narrower than the trabeculæ; zoœcia separated by narrow raised lines; thyrostome with a sinus in the lower lip and a small avicularium (not well shewn in the fossils) on one side.

S.P.; M.C. A common recent Australian species.

The specimens, which are badly preserved, do not shew the characters distinctly, but there is no doubt of the identification. A full description of this abundant recent species and its varieties is given in the Prodromus of the Zoology of Victoria.

10. *R. formosa*, McG.

R. formosa, McG., T.R.S.V., 1883; P.Z.V., 97.

Zoarium fenestrate; fenestræ rounded, narrower than the trabeculæ. Zoœcia ovate, separated by raised lines; thyrostome sloping backwards, narrower below, the thickened lateral margin uniting at an acute angle with the cell-margin; the lower lip straight with a minute sinus.

B. A single specimen. A living Victorian species.

The specimen does not shew the dorsal avicularia distinctly. On the front of the zoœcia, instead of the single avicularium of the recent form, there are several pores which are probably avicularian. The characteristic thyrostome, however, is clearly shewn.

11. *R. porcellana*, McG. Pl XV, fig. 15

R. porcellana, McG., T.R.S.V., 1869 and 1882; P.Z.V., 95.

Zoarium fenestrate, trabeculæ stout. Zoœcia rhomboidal or elongated, separated by prominent raised margins terminating at the lower part of the thyrostome; thyrostome straight or slightly hollowed below, with a small avicularium on the lower lip (in the fossil appearing as a depression or notch) and a spine on each side; one or two elliptical or linguiform avicularia on the front of the zoœcia. Dorsal surface divided into rather large areas by prominent vibices, each area with an avicularium similar to those in front.

S.P.; C.B.

12. *R. producta*, Busk.

R. porcellana, var. *laxa*, McG., P.Z.V., 95; *R. producta*, Busk, Chall. P.

Zoarium reticulate, the branches thick and massive and when anastomosing forming long angular meshes. Zoœcia elongated, with narrow raised margins; thyrostome hollowed below and with a sinus, in the lateral zoœcia the peristome produced, especially to the outside, and divided, each division (in recent specimens) bearing a spine; frequently a small avicularium below the lower lip and others on the front of the zoœcia. Dorsal surface vibicate and with small nodular elevations.

S.P.; M.C.; B.; C.B. Recent Australian.

13. *R. bairnsdalei*, n.sp. Pl. XV., fig. 14.

Fenestræ elongated, narrower than the trabeculæ; the transverse bars joining the branches non-celliferous. Zoœcia indistinct, raised anteriorly; surface smooth, thyrostome (primary) immersed, rounded above with a sinus in the lower lip; in most zoœcia the peristome much produced on one side of the sinus (less on the other), thick, projecting forwards and seemingly (?) having an avicularium on its margin. Dorsal surface finely granular, divided into irregular spaces by narrow vibices.

B.

14. *R. coriensis*, n.sp. Pl. XV., fig. 19.

Zoarium branched. Zoœcia irregularly rhomboidal or hexagonal, separated by narrow raised lines; surface smooth; thyrostome rounded, straight below; peristome raised, with a stout spine on either side about or a little above the middle; a linguiform avicularium on its lower edge, the base at the middle of the lower lip and the mandible extending to one side obliquely outwards and downwards; a small sessile or immersed avicularium about the middle of the zoœcia. Dorsal surface smooth, divided into large irregular spaces by narrow sharp vibices.

C.B.

15. *R. subimmersa*, n.sp. Pl. XV., fig. 16.

Fenestræ elongated, pointed above and below, wider than the trabeculæ. Zoœcia narrow, elongated, separated by narrow raised lines; surface smooth or very faintly granular; thyrostome rounded, peristome thickened, with a distinct rounded sinus inferiorly. Oœcia inconspicuous, convex, partly immersed. Dorsal surface smooth or faintly granular, traversed by irregular narrow vibices.

B.

16. *R. sinuosa*, Kirkp. Pl. XV., figs. 1, 1*a*.

R. sinuosa, Kirkp., A.M.N.H., 1888.

Zoarium fenestrate; fenestræ small, elongated, rather narrower than the trabeculæ. Zoœcia irregularly shaped, separated by prominent raised lines; thyrostome rounded above and finely denticulate or crenulate, with a deep rounded sinus in the lower lip much contracted at its commencement, so as to give the whole a clithridiate appearance; surface irregular, with scattered elliptical avicularia and pores. Dorsal surface divided by distinct but little elevated vibices, each area with a small rounded or elliptical avicularium.

S.P. Living. Australia.

17. *R. impar*, n.sp.

Zoarium thick; fenestræ small, elliptical, about the same width as or rather narrower than the trabeculæ. Zoœcia indistinct, smooth or very finely granular; thyrostome rounded, within the lower edge a plate with a sinus (frequently bridged over) to one side, and with a prominent avicularium on the larger side; frequently an avicularium with a long narrow mandible directed obliquely or transversely and situated on a wide, much-raised elevation on the front of the zoœcium below the thyrostome. Dorsal surface smooth or minutely granular, divided by faint vibices into elongated spaces with numerous small round pores (probably avicularian).

B.

Allied to the living *R. aurantiaca*.

18. *R. lineata*, n.sp. Pl. XV., fig. 5.

Zoarium thick; fenestræ small, elongated, elliptical, about half as wide as the trabeculæ. Zoœcia very irregular in shape and arrangement, traversed by numerous irregular sinuous raised lines; surface smooth and with a few small pores; thyrostome rounded and much depressed above, a distinct rounded sinus in the lower lip, with the angles produced upwards on each side into a prominent acicular spine, and having occasionally a smaller spine external to it; numerous scattered, rather large, broadly linguiform avicularia, sessile, subimmersed or slightly raised. Dorsal surface smooth, divided into angular spaces by strongly-marked sharp vibices, with a few rounded pores, seemingly avicularian, and mostly one in each space.

S.P.

19. *R. granulata*, McG.

R. granulata, McG., P.Z.V., 99.

Zoarium fenestrate; trabeculæ broad, nearly flat in front. Zoœcia indistinctly separated, surface finely granular; thyrostome subcircular, or with the lower lip straightened; a depression on the edge of the lower lip, with a rounded or elliptical avicularium on one side and a small sinus on the other; small immersed round avicularia on the front of the zoœcia. Dorsal surface, with a few not very prominent vibices, granular; numerous immersed circular avicularia.

S.P. Recent Australian.

I have only the single fragment. It is much less strongly granular than is usual in recent specimens. The divisions between the zoœcia are almost obliterated, as are also the dorsal vibices. The arrangement about the thyrostome varies a good

deal in recent specimens. In the fossil the avicularium is at one side, almost within the aperture, and at the other side is a small sinus or pore; this is the normal arrangement.

Sub-order CYCLOSTOMATA, *Busk.*

I. ARTICULATA S. RADICATA.

Zoarium erect, branched, divided into distinct internodes by flexible joints, attached by radical tubes. Zoœcia tubular, calcareous, in one or two series.

Family CRISIIDÆ.

The only family.

Crisia, *Lamouroux.*

Two or more zoœcia in each internode, in two alternate series.

1. *C. macrostoma*, n.sp. Pl. XVI., figs. 3, 4.

Branches narrow, cylindrical, closely and distinctly punctate. Zoœcia entirely connate and undistinguishable; thyrostome rounded or elliptical, opening outwards and upwards.

M.C.

I have only a few specimens of this species and none of them seem to represent complete internodes. The zoœcia are quite indistinct throughout. In that shewn in fig. 3 there is a faint raised line along the middle marking the division of the two series of zoœcia.

2. *C. gracilis*, n.sp. Pl. XVI., fig. 5.

Branches very slender, punctate. Zoœcia closely adnate throughout but defined on the surface, arched outwards; thyrostome circular, scarcely projecting and opening outwards and upwards.

M.C.

Closely allied to the last, of which it may be a slender variety. It differs in the zoœcia being defined on the surface by a faint groove and being more arched outwards. The puncta are also fewer and smaller.

3. *C. acropora*, Busk. Pl. XVI., figs. 2, 8, 9.

C. acropora, Busk, Voy. of "Rattlesnake," Vol. I., 351; B.M.C., III., 6; C.P., II., 6; MeG., P.Z.V., 39.

Internodes with 9-17 zoœcia, the number usually being nine, finely punctate. Zoœcia closely adnate; thyrostome slightly produced and turned forwards, circular, with a sharp denticle from the outer and upper edge immediately behind the margin of the orifice. Oœcia pyriform, on the front of the internodes. Lateral branches springing from the base of the second zoœcium on one side immediately above the thyrostome of the first.

S.P.; M.C.; B.R. A common living Australian species.

In the fossils the thyrostomes are a good deal worn and the characteristic process is consequently not usually present. In some specimens, however, it is well shewn. In living specimens the joints are black.

4. *C. eburnea*, Linn., sp. Pl. XVI., fig. 10.

C. eburnea, Busk, B.M.C., III., 4; Hincks, B.M.P., 420; Busk, C.P., II., 5; *C. margaritacea*, Busk, B.M.C., III., 6.

Internodes with 8-15 zoœcia, finely punctate. Zoœcia closely adnate; thyrostome turned forwards and slightly produced, circular, entire. Branches originating from the side of a zoœcium, varying from the second to the fourth, immediately below the orifice.

M.C.; B.R. Living. Europe, North America, New Zealand, Australia.

This seems to be identical with Busk's *C. margaritacea*, which occurs rarely at Port Phillip Heads. In the recent specimens the joints are pale-coloured, not black as in *C. acropora* and *C. denticulata*. The branches are occasionally very slender.

5. *C. scalaris*, n.sp. Pl. XVI., fig. 1.

Internodes very long and slender, with upwards of twenty zoœcia, the surface minutely punctate; crossed below the thyrostomes by small, slight, transverse elevations. Zoœcia indistinct; thyrostome circular, slightly exserted and turned forwards and upwards. Dorsal surface finely punctate, crossed at intervals by small transverse elevations similar to those in front. Branches originating by a very wide articulation from the side of a zoœcium.

C.B.

6. *C. setosa*, McG. Pl. XVI., figs. 6, 11.

C. setosa, McG., P.Z.V., 39.

Branches very slender. Internodes, with 4-10 zoœcia, finely punctate. Zoœcia very slender, distinct, closely adnate; peristome produced, turned forwards and outwards beyond the edge of the internode; thyrostome circular, with a long hollow

spine articulated to a hollow process behind and a little below the margin. Branches originating immediately below the thyrostome of a zoœcium, usually the second.

M.C. Living. Victoria.

At once distinguished from all the other species by the single spine articulated behind the thyrostome. The upper part and orifices of the zoœcia also project farther beyond the edge of the branch.

7. *C. tenuis*, McG. Pl. XVI., fig. 7.

C. tenuis, McG., P.Z.V., 39.

Internodes with 4-8 zoœcia, punctate. Zoœcia very narrow, distinct, peristome much produced and turned forwards and outwards; thyrostome circular, unarmed. Oœcia pyriform, with a distinct tubular opening. Branches originating from the outer and posterior surface of a zoœcium.

M.C. Living. Victoria.

I have only the specimen figured, but there is no doubt of the identification.

II. INARTICULATA.

Zoarium continuous, not divided into internodes, erect, adnate or encrusting; radical tubes when present multilocular and calcareous.

Family Idmoneidæ.

Zoarium erect, branched, branches distinct or anastomosing. Zoœcia distinct, opening on one surface only.

Idmonea, *Lamouroux*.

Zoœcia arranged in parallel or subparallel rows, diverging on each side from the mesial line.

1. *I. hochstetteriana*, Stol. Pl. XVI., figs. 12-16.

Crisina hochstetteriana, Stol., Foss. Bryoz., Orakei Bay, p. 113; *Idmonea hochstetteriana*, Waters, Q.J.G.S., 1884, 684.

Zoarium irregularly branched; branches triangular, with a smooth raised ridge down the middle. Rows of zoœcia alternate, considerably projecting. Zoœcia usually three in each lateral series, closely united and confluent, slightly produced at the thyrostomes, whole surface anterior and dorsal, with numerous elongated pores

in longitudinal grooves. Oœcia dorsal, in the continuity of a branch, closely covered with pits or pores, and with a small oœcial opening on one side.

S.P.; M.C.; Belmont. Fossil, Orakei Bay, New Zealand.

Var. *bairnsdalei.*

Zoœcia usually four in a series, the innermost being quite or almost in the central line, which is very little raised, and has no distinct ridge.

B.

This is an abundant species, especially in the Schnapper Point and Muddy Creek deposits. The branches usually divide dichotomously. Secondary branches occasionally spring from the sides of a main stem at right angles, or also slightly turned upwards.

The variety *bairnsdalei* differs in the absence of the central smooth ridge, and in the greater number of zoœcia in the series. The innermost zoœcium is almost in the centre of the branch, but it cannot be said to be one of an azygos series, the presence of which is the foundation of Jullien's proposed genus *Tervia*. The zoœcia are also farther apart and more distinct towards the thyrostomes.

Smitt (Floridan Bryozoa, Pt. I., p. 6) refers a Floridan specimen to this species, but the identification admits of great doubt.

2. *I. radians*, Lamk. Pl. XVI., fig. 18.

Retepora radians, Lamk. Anim. Sans Vertebres, Ed. 1st, II., 183; Ed. 2nd, II., 279; Brussell's Ed., I., 250; *Idmonea radians*, Busk, B.M.C., III., 11; *id.*, C.P., II., 10; McG., P.Z.V., 68; Waters, Q.J.G.S., 1884, 684; ? Stoliczka, *l.c.*, 116.

Zoarium rising from a narrow base, the branches dividing dichotomously and usually spreading in a radiating manner, raised in front and flat behind. Zoœcia in alternate series of 1-4; when more than one in a series the inner the longest; surface fibrillate and perforated. Dorsal surface longitudinally sulcate, the sulci occupied by pores.

B. Living. Victoria.

Of this, which is a not uncommon recent species, I have only the figured specimen from Bairnsdale. In it the zoœcia are mostly two, but sometimes three in a series, in the latter case the outermost being shorter and having the aperture separated and not produced, while the inner pair project forwards and are closely united.

3. *I. atlantica*, Edward Forbes. Pl. XVI., fig. 17; Pl. XVII., fig. 8.

I. atlantica, Busk. B.M.C., III., 11; C.P., II., 10; Hincks, B.M.P., 451; McG., T.R.S.V., 1886; Smitt, Floridan Bryozoa, Pt. I., 6; Waters, Q.J.G.S., 1884, 683.

Branches dichotomously divided, triangular in section. Zoœcia distinct, connate, in alternate rows of two or three, the innermost being the longest, anterior portions turned much forwards, smooth. Dorsal surface flat or slightly concave, finely longitudinally sulcate and occasionally transversely corrugated, the ridges between the sulci finely punctate.

S.P.; B. Living. Northern Europe, Madeira, Florida, Australia.

4. *I. contorta*, Busk. Pl. XVII., figs. 4, 5.

I. contorta, Busk, B.M.C., III., 12.

Zoarium consisting of dichotomously divided branches. Zoœcia in alternate series of 4-6, distinct throughout but closely connate, the upper third sharply turned forwards and nearly erect, smooth (from attrition) or finely punctate. Dorsal surface longitudinally finely ridged, the ridges continuous and separated by narrow grooves.

B.; C.B. Living. New Zealand.

The zoœcia are distinctly separated throughout by shallow grooves which, however, in some specimens are replaced by narrow raised lines. The ridges also on the back, are usually separated by narrow grooves which, with age, are similarly replaced by narrow raised lines.

In the fossil specimens the branches are nearly or quite straight, while in the recent they are short and contorted. I have, however, one recent specimen from New Zealand in which the branches are almost straight, so that I see no reason for separating the present even as a variety.

5. *I. geminata*, n.sp. Pl. XVII., fig. 7.

Branches rounded in front, slightly hollowed behind; whole surface closely punctate. Zoœcia elongated, indistinct, arranged in alternate series of two, united except at the extremities. Dorsal surface transversely rugose.

S.P.

6. *I. trigona*, n.sp. Pl. XVII., fig. 6.

Zoarium dichotomously branched; branches trigonal in section, posteriorly very slightly convex, flat or usually slightly hollowed. Zoœcia in alternate series of three, distinct throughout, curved slightly forwards at the anterior extremity,

strongly punctate. Dorsal surface longitudinally sulcate, with narrow punctate ridges between the sulci.

S.P.; M.C.; Belmont.

7. *I. serialis*, Stol. Plate XVI., fig. 20.

I. serialis, Stol., Foss. Bryoz. Orakei Bay, p. 118.

Zoarium dichotomously branched; branches triagonal in section. Zoœcia in alternate series of five, much elongated, distinct throughout, punctate. Dorsal surface slightly convex, longitudinally sulcate, with punctate ridges between the sulci.

M.C.

Very doubtfully distinguished from the last, from which it differs in the more numerous and narrower zoœcia and the finer punctation.

8. *I. incurva*, n.sp. Pl. XVI., fig. 19.

Zoarium dichotomously divided; branches somewhat triagonal in section. Zoœcia in transverse series of about three, long, narrow, distinct throughout, anterior extremities sharply curved forwards and united up to the elliptical thyrostomes. Dorsal surface with narrow, continuous, longitudinal ridges, with distinct intervening sulci similar to those separating the zoœcia in front.

M.C.

A very distinct and elegant species. The whole branch is formed by a mass of tubes, the dorsal ridges being the convex surfaces of the most superficial.

9. *I. venusta*, n.sp. Pl. XVII., figs. 9, 10.

Branches very slender, dichotomously divided, nearly circular in section. Zoœcia very long, in alternate series of two, distinct, the upper part curved forwards, smooth or minutely punctate; peristomes much produced, those of each pair being separated from each other. Dorsal surface with distinct, narrow, convex ridges, closely punctate, separated by marked grooves. Occasional radical tubes from the posterior surface.

M.C.

This very beautiful species is distinguished by the long, slender pairs of zoœcia projecting forwards above, and the much produced peristomes. One specimen, not otherwise distinguishable, is thicker and has three zoœcia in each series.

10. *I. divergens*, n.sp. Pl. XVIII., fig. 1.

Branches dichotomously divided, rounded in front, flattened behind. Zoœcia in oblique lateral rows, semispiral or irregularly arranged, numerous, distinctly separated by longitudinal grooves and narrow lines; thyrostome circular, turned slightly forwards. Dorsal surface smooth, with narrow, raised white lines diverging from the centre to the circumference.

B.

The zoœcia are arranged in series, but these are very irregular. Several are distinctly bilateral, in some there is only one series obliquely across the front, while again in others the series are much broken and many of the zoœcia irregularly placed. The dorsal surface is smooth but has a series of narrow, raised, white lines diverging upwards and outwards from the central line. Of these there are generally two to embrace the outer extremities of the zoœcial series. This species forms a transition to the genus *Filisparsa*, and is evidently closely related to Jullien's *Tervia solida*.

11. *I. semispiralis*, n.sp. Pl. XVIII., fig. 4.

Branches round, dichotomously divided. Zoœcia very long, in spiral series nearly extending the whole circumference of the branch; surface punctate; thyrostome elliptical, slightly projecting forwards.

M.C.

Allied to *I. bifrons* (Waters), but there is no break in the zoœcial series in front.

12. *I. milneana*, D'Orbigny. Pl. XVII., figs. 1, 2.

I. milneana, D'Orbigny, Voy. dans l'Amerique méridionale, V., p. 20; Busk, B.M.C., III., 12; *id.*, C.P., II., 13; Smitt, Floridan Bryozoa, Pt. I., 8; McG., P.Z.V., 68; *I. giebeliana*, Stol., Foss. Bry. Orakei Bay.

Zoarium spreading; branches dichotomously divided, broad, anterior surface convex. Zoœcia in opposite curved series of 2-5 on each side, and usually an azygos one in the middle, distinct, but closely connate, except at the extremities, and much curved forwards; surface rough, with close-set small raised pores; internal aspect of zoœcia similarly furnished. Dorsal surface with longitudinal ridges separated by sulci, and in older parts transversely corrugated.

M.C.; B. Living. South America, Florida, Australia.

I am not sure that some of the specimens I have referred to this may not belong to the closely-allied living *I. interjuncta* (McG.).

13. *I. lata*, n.sp. Pl. XVII., fig. 3.

Branches broad and very slightly convex or nearly flat. Zoœcia in curved series of about five on each side and usually an azygos one in the middle, long, distinct throughout but closely connate, curved forwards, peristome produced and turned forwards, surface smooth and destitute of raised pores. Dorsal surface in the only specimen somewhat worn, but in the central part shewing longitudinal tubes (opened ridges), and at the edges the same directed transversely outwards.

M.C.

Differs from *I. milneana* in the flatter branches, the more numerous and smaller zoœcia, the absence of raised pores, and the difference of the dorsal surface.

14. *I. conferta*, n.sp. Pl. XVIII., fig. 3.

Branches rather broad, slightly convex in front. Zoœcia in opposite, rather close series, punctate, diverging from a central azygos one, indistinct except at the extremities, where the peristome is a very little raised and tumid; thyrostome large and elliptical. Dorsal surface flat or slightly depressed, closely punctate, concentrically corrugated, and having occasional bundles of radical tubes.

M.C.

Filisparsa, *D'Orbigny*.

Branches more or less dichotomously divided. Zoœcia on one side irregularly placed. Dorsal surface destitute of pores.

Although I here adopt this genus, I have very great doubt as to its necessity.

1. *F. orakeiensis*, Stol. Pl. XVIII., fig. 5.

F. orakeiensis, Stol., Foss. Bryoz. Orakei Bay, p. 111.

Branches narrow. Zoœcia elongated, opening in obscure lines or irregularly arranged, closely united and depressed; thyrostome slightly raised and turned forwards, peristome slightly thickened. Dorsal surface finely punctate, longitudinally sulcate and concentrically corrugated.

M.C.

Hornera, *Lamx.*

Zoarium branched; branches distinct, usually anastomosing or connected by cross-bars. Zoœcia distinct, opening irregularly on one surface.

1. *H. lichenoides*, Pontoppidan.

Hornera lichenoides, Hincks, B.M.P., 468; Busk, B.M.C., III., 17; Busk, C.P., 15.

Anterior surface fibrillate, the fibrillæ narrow and smooth, the enclosed spaces angular below and having a few pores; thyrostome elliptical, the peristome elevated and entire.

S.P. A single small fragment. Living. Europe and Australia.

2. *H. frondiculata*, Lamx. Pl. XVIII., figs. 7, 8. Pl. XIX., fig. 7.

Hornera frondiculata, Busk, B.M.C., III., 17.; *id.*, C.P., L, 15; Waters, Q.J.G.S., XL., p. 687.

Zoarium robust, branches irregular, subcylindrical, mostly in one plane. Anterior surface with strong, smooth or transversely rugose fibrillæ, dividing it into elongated spaces, containing several pores, for the zoœcia; zoœcia with the peristome thickened and emarginate or bifid above. Dorsal surface strongly longitudinally fibrillate, the fibrillæ usually nodulated or rugose, the intervening sulci with numerous pores.

S.P.; M.C.; C.C. (W.); B. (W.). Living. Mediterranean.

Var. *aperta*, Pl. XIX., fig. 7.

Zoœcial spaces large, usually with a distinct pore below the zoœcium, the separating fibrillæ very prominent, with numerous sharp transverse ridges; anterior part prominent, the thyrostome much raised at the sides and widely open above so as to have a horseshoe shape. Dorsal fibrillæ very prominent, transversely ridged like the anterior, the intervening sulci narrow with well-marked pores.

The only specimen is very stout, rising from an expanded base.

3. *H. quadrata*, n.sp. Pl. XVIII., fig. 10.

Branches slender. Anterior surface divided by wide, smooth or tuberculated ridges into oblong spaces the width of the zoœcia and destitute of pores; thyrostome at the upper extremity of each space projecting, peristome circular, entire. Dorsal surface strongly longitudinally fibrillate, the ridges granular or transversely nodulated, and the intervening sulci destitute of pores.

S.P.; M.C.

Distinguished by its slender branches, the non-porous regular zoœcial spaces, the small, round, entire thyrostome, and the non-porous dorsal surface.

4. *H. curva*, n.sp. Pl. XVIII., fig. 6.

Branches slender, nearly cylindrical, dichotomously divided, curved and slightly twisted. Zoœcia distinct, very long, turned sharply forwards at the anterior extremities; the thyrostomes being prominent, circular and entire; surface closely covered with minute prominences. Posterior surface longitudinally sulcate and transversely rugose, destitute of pores and having the ridges thickly covered with similar elevations to those on the front.

M.C. A single specimen.

5. *H. elevata*, n.sp. Pl. XVIII., fig. 9.

Branches dichotomously divided. Anterior surface obscurely fibrillate, the fibrillæ smooth and little prominent and with a few small pores in the sulci. Zoœcia raised anteriorly and frequently joined by lateral elevations separated by oblique depressions or furrows, and giving the whole an obliquely serial appearance; thyrostomes circular, peristome raised and entire. Posterior surface sharply longitudinally fibrillate, the fibrillæ prominent and smooth.

Belmont.

6. *H. foliacea*, McG. Pl. XIX., fig. 1.

Hornera foliacea, McG., P.Z.V., pl. 118; Waters, Q.J.G.S., XL., p. 688; *Retihornera foliacea*, Busk, B.M.C., Pt. III.

Zoarium formed of subparallel branches, dichomotously divided and joined at irregular intervals by usually non-celliferous cross-bars. Anterior surface divided into elongated pointed areas by prominent, well-marked fibrillæ, each area containing a zoœcium; several pores in the areas; thyrostome slightly projecting in the central cells, thickened and emarginate above, in the lateral cells more produced and lacerated. Dorsal surface strongly fibrillate with pores between the fibrillæ.

M.C.; B. (W.). Living. Victoria.

This is a common living species fully described in P.Z.V. The expanded zoarium is formed by dichotomously-dividing branches, connected at irregular intervals by straight transverse bars. These bars, as a rule, are entirely non-celliferous, although occasionally a zoœcium from the branch is incorporated in it. In one specimen some of the branches anastomose directly without the intervention of the cross-bars, but in parts there is the usual non-celliferous connection. The fossils do not shew oœcia; in recent specimens they are large and dorsal.

7. *H. sulcata*, n.sp. Pl. XIX., figs. 2, 6.

Zoarium massive, branches thick, irregularly divided. Anterior surface strongly longitudinally fibrillate, the ridges thick and separated by deep sulci with elliptical

spaces for the openings of the zoœcia; thyrostomes little prominent or immersed, the peristome below raised and entire or sinuated, and with a prominent rounded or subconical eminence immediately below the lower margin. Posterior surface strongly longitudinally fibrillate, the fibrillæ minutely tubercular or granular and the intervening sulci destitute of pores.

B.

8. *H. involuta*, n.sp. Pl. XIX., fig. 3.

Zoarium stout, branches irregularly dichotomously divided, slightly convex in front, flat and depressed behind. Anterior surface with strong, sharply-raised longitudinal ridges, between which are the depressions for the zoœcia, the depressions having a few pores; the zoœcia in the centre irregularly arranged, on the margins arranged at regular intervals in transverse rows of one or two, the external much projecting; peristome in the central zoœcia projecting and frequently slightly prominent on each side and deficient above; external zoœcia with outer margin of peristome much produced and pointed. Posterior surface flat or slightly depressed, with longitudinal ridges, the broad intervening spaces usually crossed at short intervals by transverse elevations leaving small pits with frequently a pore at the bottom; margin of branches regularly sinuated by the projection of the lateral zoœcia, with a thickened rim running upwards and downwards from the zoœcia, usually turned back to form an involuted rim, but occasionally above a zoœcium sending a branch to form one of the dorsal ridges

C.B.

A very peculiar and well-marked species.

9. *H. tenuis*, n.sp. Pl. XIX., fig. 4.

Branches very slender, usually in three series of zoœcia in the front. Anterior surface smooth, divided into three series of depressions or furrows by raised smooth margins, the depressions being wider at the orifices of the zoœcia; zoœcia with the thyrostomes directed forwards, circular, entire or sinuated at the proximal edge. Posterior surface with wide, flat sulci, with a few raised pores separated by raised crenulated margins.

Belmont.

10. *H. diffusa*, n.sp. Pl. XIX., fig. 5.

Branches long, slender, irregularly divided. Anterior surface with very obscure ridges, granular or transversely tuberculated, numerous pores usually arranged longitudinally, but except towards the extremities of the branches the zoœcial

spaces not distinctly marked; anterior extremity of zoœcium prominent; thyrostome entire, but the much-produced peristome deeply laciniated. Dorsal surface with thick, prominent, tuberculated fibrillæ, and regular series of elongated pores in the narrow sulci.

C.B.

11. *H. tuberculata*, n.sp. Pl. XIX., fig. 8.

Branches rather slender, rounded; anterior surface with numerous tubercles or short transverse ridges, usually not fibrillate, but sometimes divided by sulci into longitudinal ridges; thyrostomes small, circular, with thickened and slightly-produced peristomes. Posterior surface fibrillate, the fibrillæ sometimes wanting, the ridges with numerous tubercles or short transverse ridges frequently stretching across the situation of the sulci, which are then obliterated.

B.; C.B.

12. *H. prominens*, n.sp. Pl. XIX., fig. 9.

Zoarium small; branches slender, dichotomously divided. Anterior surface with prominent tuberculated ridges, the intervening zoœcial spaces much narrowed at the extremities. Zoœcia prominent; thyrostome circular, the much-produced peristome entire or more prominent on either side; a small pore in the space immediately above the thyrostome. Dorsal surface with thick, prominent longitudinal transversely nodulated or ridged fibrillæ, the narrow sulci with a few small pores.

M.C.

Family Tubuliporidæ.

Zoarium encrusting or adnate, or partially or wholly erect; when erect, bilaminate or cylindrical. Zoœcia tubular, when zoarium erect, opening on two surfaces or all round. No intercellular cancelli. Oœcium an inflation of part of the zoarium.

Tubulipora, *Lam.r.*

Zoarium adnate, irregularly shaped, frequently lobed or flabellate. Zoœcia elongated, tubular, distinct, partially free, arranged in more or less diverging series.

1. *T.* sp.

There is a portion of a colony of a Tubulipora on the same fragment of Retepore as *Stomatopora mæandrina*, but not sufficiently perfect for identification or description.

B.

Stomatopora, *Bronn.*

Zoarium adnate, simple or irregularly branched; branches linear or ligulate. Zoœcia in simple series or in more or less regular transverse rows.

1. *S. mæandrina*, n.sp. Pl. XX., fig. 2.

Of this I have only a single specimen growing over a Retepore. It forms a long curved zoarium, convex. At the growing extremity the zoœcia are separated by narrow grooves or depressions; at the fully-formed parts they are very indistinctly arranged, confused or separated only by very faint raised lines. The surface is smooth or densely minutely granular. The thyrostomes are circular, the peristome thickened and turned abruptly forwards and produced. The inner surface is spinous but without distinct denticles or processes. In the growing part there is a very narrow thin basis projecting beyond the edge.

B.

2. *S. geminata*, McG. Pl. XX., fig. 1.

S. geminata, McG., P.Z.V., pl. 176; *id.*, T.R.S.V., XXIII., 1886, p. 36.

Zoarium branched; branches narrow, consisting of series of pairs of zoœcia. Zoœcia very long, narrow, closely united throughout their whole length; surface minutely granular; thyrostome projecting and turned forwards, circular.

M.C. Living. Victoria.

Diastopora, *Johnston.*

Zoarium adnate, discoid or flabelliform or lobed, or wholly or partly raised and bilaminate. Zoœcia tubular, with an elliptical or subcircular thyrostome, crowded and immersed towards the centre, more distinct and partially free towards the margins.

1. *D. discoidea*, n.sp. Pl. XX., fig. 3.

(For description see Appendix.)

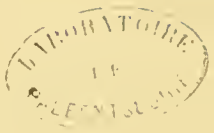
2. *D. patina*, Lamk. Pl. XX., figs. 4, 5.

Diastopora patina, Hincks, B.M.P., 458; Busk, B.M.C., III., 28; McG., C.V., 32,; *id.*, P.Z.V., XV.

Zoarium thin, crustaceous. Zoœcia decumbent and adherent except at the extremities, which are free and slightly turned forwards; thyrostomes elliptical,

entire; surface of zoœcia and intervening spaces finely granular or transversely corrugated. Oœcium a distinct, rounded inflation of the zoarium, closely punctate.

M.C. Living. Victoria.



3. *D. recta*, n.sp. Pl. XX., fig. 6.

Zoarium adnate. Zoœcia indistinct, except at the extreme anterior extremities, which are turned directly forwards; thyrostome circular, with a thick peristome; surface of zoarium and zoœcia granular, finely corrugated.

M.

Distinguished by the total obliteration of the junction of the zoœcia except at the anterior extremities, which are turned forwards, which, with the peristomes, seem to rise abruptly from a continuous, finely-granular and faintly rugose surface.

4. *D. torquata*, Kirkp. Pl. XX., fig. 7.

Bidiastopora torquata, Kirkp., A.M.N.H., 6, II., 15.

Of this the only specimen I have is the extremity of the branch figured. It is narrow and consists of two layers of zoœcia placed back to back; the zoœcia are distinct, very long and narrow, closely connate except at the extremities, which are free, abruptly curved forwards and project as long peristomial tubes; the decumbent portions are closely and distinctly punctate, the erect parts smooth and glossy or finely-ringed; the peristomial opening circular and entire.

M.C. Living. Victoria.

I have beautiful recent specimens from Mr. Wilson dredged at Port Phillip Heads, shewing the whole structure of the species. In these the branches rise from an expanded, crustaceous, discoidal base, and are in reality formed by a double layer of zoœcia. D'Orbigny introduced the genus *Bidiastopora* for those Diastopores forming narrow bilaminate branches, in the same way as Blainville's *Mesenteripora* includes the bilaminate foliaceous forms. These distinctions, however, cannot be considered of generic value, and the species so constituted can at most only be referred to sub-genera. Two species of the latter form, *D. capitata* and *instata*, the former really intermediate between the sub-genera, occur living at Port Phillip Heads.

Liripora, *McG.*

1. *L. bicolor*, McG. Pl. XX., fig. 8.

(For description see Appendix.)

2. *L. fasciculata*, McG. Pl. XXII., fig. 4.

(For description see Appendix.)

3. *L. superposita*, n.sp. Pl. XXII., fig. 6.

(For description see Appendix.)

Tecticavea, *D'Orb.*

Zoarium erect, consisting of series of superposed stipitate celliferous discs, each disc rising from the centre of the one beneath. Zoœcia not arranged in lines, but opening along the circumference of the disc.

1. *T. schnapperensis*, n.sp. Pl. XX., fig. 9.

Zoarium formed of a series of superposed discs diminishing regularly upwards, each rising from the preceding by a broad base. Discs concave above, the zoœcia opening in about two irregular series in the margin, which slopes abruptly from above outwards; orifices of zoœcia very irregularly shaped; some shewing distinct small spines inside, the openings of a few smaller pores interspersed among those of the zoœcia. Under-surface obscurely radiately marked.

S.P.

Some of the connecting parts or stems are very wide, the discs being then separated by little more than a deep groove; and one or two of the discs project more on one side.

Entalophora, *Lamx.*

1. *E. australis*, Busk. Pl. XX., figs. 10, 11.

(For description see Appendix.)

2. *E. verticillata*, Goldf. Pl. XX., figs. 12, 13.

(For description see Appendix.)

3. *E. longipora*, n.sp. Pl. XX., figs. 14, 15.

(For description see Appendix.)

4. *E. punctata*, n.sp. Pl. XXI., fig. 2.

(For description see Appendix.)

5. *E. multipora*, n.sp. Pl. XXI., fig. 1.
(For description see Appendix.)

Family Lichenoporidæ.

Lichenopora, *Lamx.*

1. *L. hispida*, Flem. Pl. XXI., fig. 3.
(For description see Appendix.)

2. *L. radiata*, Aud. Pl. XXI., figs. 4, 5.
(For description see Appendix.)

3. *L. echinata*, McG. Pl. XXI., fig. 8.
(For description see Appendix.)

4. *L. porosa*, n.sp. Pl. XXI., fig. 9.
(For description see Appendix.)

5. *L. wilsoni*, McG. Pl. XXI., figs. 10, 11.
(For description see Appendix.)

6. *L. reticulata*, McG. Pl. XXI., fig. 7.
(For description see Appendix.)

7. *L. australis*, n.sp. Pl. XXI., fig. 6.
(For description see Appendix.)

8. *L. cribraria*, n.sp. Pl. XXI., fig. 12.
(For description see Appendix.)

Discofascigera, *D'Orb.*

Zoarium small, discoid, stipitate. Superior surface entirely covered with large pores with smaller interposed, with no definite arrangement.

1. *D. tubulifera*, n.sp. Pl. XXI., fig. 13.

Superior surface convex. Zoœcial openings angular, slightly granular or spinose internally, with a few smaller pores interspersed. Inferior surface smooth,

with slight irregularly-annular ridges; stem consisting of closely-packed angular tubes, internally spinose. On one side, about midway between the junction of the stem and the margin, are two thick stout calcareous tubes projecting a considerable distance.

M.

Discofascigera differs from *Defrancia* and other stipitate forms in having the zoœcia covering the whole upper surface and not arranged in any definite order. The interstitial tubes or pores, which are very few, are smaller but otherwise indistinguishable. It is difficult to say what the large projecting tubes represent. They may possibly communicate with an internal oœcium, but that is improbable, as such a structure is unknown among the Cyclostomata.

Heteropora, *Blainv.*

1. *H. nodulosa*, n.sp. Pl. XXI., fig. 14.
(For description see Appendix.)

2. *H. pisiformis*, n.sp. Pl. XXI., fig. 15.
(For description see Appendix.)

Family FRONDIPORIDÆ.

Supercytis, *D'Orb.*

1. *S. digitata*, D'Orb. Pl. XXII., figs. 1, 2.
(For description see Appendix.)

Fasciculipora, *D'Orb.*

1. *F. fraticosa*, McG. Pl. XXII., fig. 3.
(For description see Appendix.)

2. *F. disticha*, n.sp. Pl. XXII., fig. 5.
(For description see Appendix.)

Frondipora, *Imperato.*
(See Appendix).

1. *F. palmata*, Busk. Pl. XXII., figs. 8, 9.

Frondipora palmata, Busk. B.M.C., III., 38.

Zoarium stipitate, branched; the branches horizontal with short lateral secondary branches. Zoœcia arranged in continuous raised clusters along the centre of the upper surface of the branches. Dorsal surface with distinct longitudinal and reticulated ridges.

B. Recent locality unknown? Australia. (Busk).

Discotubigera, *D'Orb.*

1. *D. gambierensis*, Waters. Pl. XXII., figs. 8, 9. 10

(For description see Appendix.)

APPENDIX.

By T. S. HALL, M.A., Demonstrator and Assistant Lecturer in Biology in the University of Melbourne.

The following pages deal with the species which were either left undescribed by Dr. McGillivray, or were only in rough manuscript, and the plates for which were already in the lithographer's hands. His names have in every instance been followed. In the cases where a suitable description by another author was available, I have extracted it, and have acknowledged the quotation. In other instances I have drawn up diagnoses based upon an examination of the figured specimens and such other examples as the collection contained. In the case of the family *Bitectiporidæ*, of which only two examples occur in the collection, I have merely described the specimens carefully, and have refrained from an attempt at indicating the family or even generic characters on which its separation was based. Had the name not occurred in the Table of Classification, which had already been struck off, I should have placed it under one of the other genera to which, as the slide shows, Dr. McGillivray had at some time provisionally referred it.

Bitectipora lineata, McG. Pl. XIII., fig. 20.

There are two specimens of this puzzling form, but both show the same characters. The zoarium is unilateral and apparently encrusting, the figured specimen having the form of a hollow cylinder, while the other, a mere fragment, is a flat expansion. The zoœcia occur under two very distinct forms between which the specimens do not show any gradations. The older series is arranged in longitudinal rows, and the boundaries are distinctly marked by projecting, plate-like ridges. The thyrostome is at the anterior end at the base of a funnel-shaped depression, the axis of which is almost parallel to that of the zoarium, so that this fact together with the occurrence of matrix quite prevents its true shape being seen. A tubular prominent papilla, probably avicularian, occurs on its lower edge.

The younger zoœcia, which are perhaps really oœcia, overlie the older, and although each appears to overlie a single one of the older series, yet as the apertures look in all directions the colony assumes an irregular appearance. The aperture is subcircular with a slight sinus on the lower lip, and with two lateral denticles within; these, though not shown in the figure, are very evident in the specimens. Below the mouth is a large crescentic area, flat, smooth and depressed, with a thin but imperforate wall, apparently avicularian. The surface of the younger zoœcia is inflated, while that of the older forms is not so. The surface of the whole colony

is pitted with numerous rounded pores. The texture of the surface in the two sets of zoœcia is identical, and as the ridges are prolonged from one set to the other without interruption, and no bounding line can be seen between a zoœcium and the one it is overgrowing, it does not appear possible to regard it as an incrustation of one species on another.

The zoœcial wall of the younger series grows forwards and covers over the thyrostome of the older series, the avicularian tube long persisting as a blunt cone.

The posterior surface of the colony is imperforate and the zoœcia are marked out from one another by impressed longitudinal lines, the transverse boundaries not being shown.

G.; B.

Haswellia, *Busk.*

"Zoarium composed of short cylindrical branches, spreading in all directions dichotomously, at very open angles. Zoœcia disposed verticillately and more or less irregularly quincuncial, with a produced tubular or subtubular and bifid or simply thickened peristome, supporting on each side a small avicularium with a pointed subtriangular mandible. Primary mouth clithidiate, with an operculum of corresponding form."—(Busk).

H. longirostris, McG. Pl. XIV., fig. 20.

Cellepora longirostris, McG., T.R.S.V., Nov., 1884.

"Zoarium erect, branched, cylindrical. Zoœcia elongated, a lateral sinus in the lower lip, with a small avicularium on one side; on the front of the zoœcium a large avicularium with the long mandible directed vertically downwards. Oœcia rounded, flat in front, with a raised rim, inside which is a row of areolæ or pits directed inwards."

S.P.; M.C. Living. Australia.

"In recent specimens the mandibles of the zoœcial avicularia are narrow and pointed, not broad and rounded as in the fossil."—(McG. *ms.*).

2. *H. producta*, McG. Pl. XIV., figs. 16-19.

"Zoarium small. Zoœcia confused, more or less erect; mouth (primary) arched above, with a well-marked small sinus below, peristome thickened and slightly elevated all round; a suboral rostrum bearing an avicularium on its summit; scattered, large, spatulate avicularia with a distinct columella."—(McG. *ms.*).

S.P.; M.C.; B.

Diastopora discoidea, McG. Pl. XX., fig. 3.

Zoarium discoid, raised on a slight stalk, base flat; basal lamina finely punctate, and, in the only specimen, in places finely reticulately porous. Zoœcia arranged in single broken rows which run from the centre outwards in curved lines. Walls porous. At the edge the zoœcia become much crowded, so as to give the entire margin a cancellated appearance. Spaces between the zoœcia covered by a finely punctate transversely wrinkled lamina.

S.P.

Liripora, *McG.*

"Zoarium crustaceous, growing on a basal lamina. Zoœcia not projecting, arranged in single or multiple series, forming raised ridges radiating more or less regularly from a central part, opening along the summits of the ridges or towards their extremities, intervening grooves occupied by a punctate calcareous membrane." —(McG.).

L. bicolor, McG. Pl. XX., fig. 8.

Diastopora bicolor, McG., T.R.S.V., 1884, p. 117.

"Zoarium nearly circular, consisting of three parts; a central elevated portion composed of perfect cells, surrounded by a broad fringe of imperfectly-developed cells, beyond which is a thin lamina." . . "The central portion is much raised, flat, and depressed at the centre. The cells are arranged in irregular radiating series; the series are distinct, but without intervening spaces. The cells are slightly rugose, and thickly punctate. The mouth is oval or elliptical, with slightly thickened margin; those of the marginal cells are open, most of the inner being filled in by a plate punctate or perforated like the rest of the cell. In the central part are numerous rounded eminences, mostly at the commencement of the series of cells, and of the same width; they are punctate or perforated in the same manner, but present no trace of mouth. The surrounding fringe consists of a broad layer of imperfectly-developed cells; the thin lamina beyond this is marked with slight radiating grooves, as occurs in the corresponding part of other species of *Diastopora* and *Discoporella*."—(McG.).

M.C. Living. Victoria.

The above description is taken from a recent specimen, but with the exception of the projecting basal lamina, which has disappeared, might have been written of the single specimen from Muddy Creek.

2. *L. fasciculata*, McG. Pl. XXII., figs. 4, 7.

Diastopora fasciculata, McG., T.R.S.V., 1884, p. 97.

"Zoarium adnate, with a distinct lamina, partly free at the edges. Cells arranged in distinct, elevated, radiating ridges, very much enlarged and prominent at the extremities; the narrow parts very prominent, transversely wrinkled, and showing the mouths of a few closed cells, the extremities forming bundles of closely-packed cells, mostly opening terminally. The surface between the ridges punctate and transversely rugose."—(McG.).

M.C.; M. Living. Victoria.

3. *L. superposita*, McG. Pl. XXII., fig. 6.

Zoarium thick, discoid. Zoœcia opening along raised ridges. A single series in each ridge towards the centre, increasing to two or three towards the periphery. Radial furrows between the ridges floored by a finely-punctate, coarsely-transversely rugose, calcareous lamina.

B.

Differs from *L. lineata* in having the transverse lines or wrinkles in the furrows much coarser, and approaching *L. fasciculata* in this respect. The flooring lamina is broken away for some distance in one place, and shows that it was produced at successive intervals of growth, as another similar lamina is seen at the base of the large cavity thus displayed. As the specimen is rather worn the projecting part of the basal lamina is not shown.

Entalophora, *Lamx.*

"Zoarium erect, branched; branches cylindrical or clavate, with tubular zoœcia opening all round."—(McG.).

1. *E. australis*, Busk. Pl. XX., figs. 10, 11.

Pustulopora australis, Busk, B.M.C., III., 21; *id.*, "Voyage of the Rattlesnake," I., 350; *Entalophora australis*, McG., C.V., 32

"Zoarium branched dichotomously; branches short, incrassated, truncate; cells almost entirely immersed or about half free; surface minutely papillose, summits of papillæ of a dark brown or black colour. With age the walls become much thickened and porcellanous, with transverse rugæ."—(Busk).

M.C. Living. Australia.

2. *E. verticillata*, Goldf. Pl. XX., figs. 12, 13.

Ceriopora verticillata, Goldf., Petrefacta Germaniæ, I., 36; *Spiropora antiqua*,

D'Orb., P.F.T.C., 710; *Spiropora verticillata*, Novak. Deutscher K.K., Akad. Wien, XXXVII., 34; *Entalophora verticillata*, Waters, Q.J.G.S., XL., 685.

Zoarium branched, branches cylindrical. Zoœcial apertures arranged in whorls of a single series, the number in a whorl varying with the age and thickness of the branch. Proximal part of zoœcium approximately parallel to the long axis of the branch, distal part turned outwards at right angles to it, free and produced. Zoœcial margins marked on the internodes by a faint raised line; surface minutely but very distinctly punctate. Free portion of zoœcium corrugated transversely to its length.

M.C.; M. Belmont. A very common form. Jurassic to late Tertiary, Europe.

3. *E. longipora*, MeG. Pl. XX., figs. 14, 15.

Zoarium branched. Zoœcia irregularly disposed, opening on all sides, very long, parallel, almost straight, lateral boundary marked by a raised line. Outer wall flat in the proximal part; near the distal end, where the zoœcium begins to turn outwards, convex. Surface covered with numerous microscopic pores.

M.C.

The great length of the zoœcial tubes is a well-marked character, they being generally from twelve to fifteen times as long as wide. The figure makes the proximal part of the zoœcia convex instead of flattened, with a raised bounding ridge.

4. *E. punctata*, MeG. Pl. XXI., fig. 2.

Zoœcia short, about six or eight times as long as wide. External wall tumid, bounded by a rounded ridge. Apertures arranged in an irregular quincuncial manner. Surface pierced by numerous large pores arranged in oblique lines.

S.P.

The single specimen is somewhat worn, so that the length of the free portion of the zoœcium is not known.

5. *E. multipora*, MeG. Pl. XXI., fig. 1.

Zoarium branched, branches compressed. Zoœcia in two oblique spirals. Zoœcial tubes short, about four or five times as long as wide. Surface smooth, with numerous large pores.

M.C.

The only specimen is much eroded so that the peristome does not project above the general surface.

Family LICHENOPORIDÆ.

"Zoarium discoid, simple or confluent; adnate or substipitate, interzoœcial spaces cancellate (cancelli sometimes obsolete). Zoœcia erect or suberect, disposed more or less regularly in series diverging from an open central area."—(Busk).

Lichenopora, *Lamx.*

"Zoarium adnate or partially free, frequently discoid or cupped, usually growing on a basal lamina, with a thin external margin. Zoœcia partially free, disposed irregularly or in radiating series, with the intermediate surface cancellated; peristome usually lacerated or pointed to one side."—(McG.).

1. *L. hispida*, Fleming, sp. Pl. XXI., fig. 3.

Lichenopora hispida, Waters, Q.J.G.S., XL., p. 694; Busk, C.P., Pt. II., 26; *Discoporella hispida*, Busk, B.M.C., III., 30.

"Zoarium subcircular, convex, with or without a narrow marginal lamina; surface uniformly covered with circular openings level with the surface, of tolerably uniform size; towards the border some of the orifices raised, subtubular and bi- or tridenticulate, disposed in obscure irregular series."—(Busk).

M.C.; B. (W.); W.P. (W.) Miocene to recent, Europe; recent Southern Australia, Britain, Greenland, Labrador.

2. *L. radiata*, Audouin, sp. Pl. XXI., figs. 4, 5.

Unicavea radiata, D'Orb., P.F.T.C., p. 971; *Discoporella flosculus*, Hincks, A.M.N.H., 3rd Ser., IX., 468; Busk, B.M.C., III., 32; *Tubulipora patina*, Milne Edwards; *Lichenopora radiata*, Waters, Q.J.G.S., XL., p. 694; McG., C.V., 33.

"Zoarium orbicular, convex, with the centre flat or depressed; cancelli small and sparse, not stellate, cells connate, disposed in much-raised uniserial rays alternately long and short; mouths obscurely mucronate. A single row of circular pores between the rows of cells."—(Busk).

M.C.; S.P.; C.C. (W.); B. (W.); Mt. Gambier (W.); Napier, N.Z. (W.); Pliocene Sicily. Living. European and Australian seas.

3. *L. echinata*, McG. Pl. XXI., fig. 8.

Discoporella echinata, McG., T.R.S.V., XX., 1883, p. 127.

"Zoarium discoid, on an expanded lamina, convex. Zoœcia irregularly radiating, distinct, apertures opening obliquely outwards; proximal edge of peri-

stomes with two sharp processes with a sinus between, or divided into several spines; surface smooth or finely fibrillo-granular, with numerous long acicular spines projecting at right angles. Cancelli numerous in the centre and in one or more rows or irregularly placed between the zoœcia; angular or rounded, usually finely denticulate and frequently with several sharp spines from the edges. Oœcium formed by a thin inflation commencing at the base of the rays and covering the centre; surface punctate, the large puncta with smaller perforations at the bottoms."—(McG. *ms.*).

B.; M. Recent Victoria.

4. *L. porosa*, McG. Pl. XXI., fig. 9.

Zoarium discoid, convex with a depressed centre. Zoœcia in radiating, slightly curved rows; a single series of zoœcial apertures in each row. Rows sometimes bifurcating towards the periphery; angle of the bifurcation occupied by one or more series of zoœcia arranged in a V-shaped manner, the base of the V pointing inwards. Towards the periphery the rows lose their individuality and the zoœcia are irregularly scattered. Near the centre of the zoarium peristome freely projecting, towards the margin flush. Cancelli in two or three irregular rows between the ridges, some opening high up on the sides of the ridges. Apertures rounded, placed each at the base of a funnel-shaped depression, the free edges of the latter marking out polygonal areas from mutual contact. Surface microscopically pitted. Basal lamina concentrically wrinkled.

B.

The single specimen is very convex, owing to its attachment to a small cylindrical foreign body, apparently the anchoring tubes of another polyzoon.

5. *L. wilsoni*, McG. Pl. XXI., figs. 10, 11.

Discoporella wilsoni, McG., T.R.S.V., XXII., 1886, p. 182.

"Zoarium discoid, cupped, the basal lamina large, and usually much upturned at the margin: centre depressed. Zoœcia in regular radiating rows, closely adnate or basally connate, very lofty at the centre, granular; orifice oblique, opening distally; peristome usually produced into two stout lateral spines, occasionally divided into several. Cancelli large, angular, one or two rows between the zoœcia, denticulate internally. Oœcium an inflation over the centre, covering wall divided by numerous spiniferous reticulated fibrillæ between which is a punctate or perforated membrane or (in the common form) with numerous small depressed areas at the bottom of which are minute perforations; duct a short thick tube, internally denticulate, opening laterally."—(McG. *ms.*).

M.C. Recent Victoria.

6. *L. reticulata*, McG. Pl. XXI., fig. 7.

Discopovella reticulata, McG., T.R.S.V., XX., 1883, p. 126.

"Zoarium orbicular, bordered, convex; cells connate, radiating in uniserial rows of irregular lengths; peristome with the outer border produced, pointed, and entire; centre of zoarium occupied by large shallow cancelli, separated by narrow raised walls; a single or double row of smaller rounded cancelli between the rows of cells. . . . The most distinctive character is the number and large size of the shallow cancelli in the centre of the zoarium. There are no spines to be seen in the interior of any of the cells or cancelli."—(McG.).

The fossil shows blunt spines in the zoœcial tubes and cancelli as shown in the figure, and the walls of the large cancelli are pierced by rounded pores.

7. *L. australis*, McG. Pl. XXI., fig. 6.

Zoarium a short blunt cone, depressed at the apex; base flat. Zoœcia arranged in regular radiating lines usually in a single series, walls confluent, apertures rounded, produced on the side nearest the centre into one or more blunt teeth; occasionally crossed by thin tabulæ at or near the orifice; walls granular with one or more longitudinal flutings on the side facing the centre. Cancelli rounded; two or three irregular rows between the radial ridges. Oœcium formed by an inflated, thin, punctate, calcareous plate in the centre of the colony and sending prolongations between the rays. A single row of cancelli between each prolongation and the zoœcial row on each side of it.

M.C.

8. *L. cribraria*, McG. Pl. XXI., fig. 12.

Zoarium discoid, depressed, apex concave. Zoœcia in radiating curved rows, sometimes bifurcating near the margin. Surface between the rows covered with a thin uneven calcareous plate extending to the margin and pierced by numerous small circular pores; a similar plate closing the cancelli slightly below their apertures; cancelli visible only near the centre of the colony.

M.C.

Heteropora, *Blainv.*

"Zoarium encrusting in a thick layer, or forming thick erect cylindrical branches. Zoœcia long, tubular, quite immersed, opening by rounded or angular orifices on the surface. Between the apertures of the zoœcia the orifices of numerous other small pores or cancelli."—(McG. *ms.*).

1. *H. nodulosa*, McG. Pl. XXI., fig. 14.

Zoarium cylindrical. Apertures of zoœcia and of cancelli almost confined to swollen annular nodes placed at intervals on the branch. Annuli separated from one another by a distance about equal to their own diameter. Zoœcia in each annulus very numerous, irregularly disposed, apertures subcircular, and approximately equal in size. Cancelli very numerous and of various sizes, circular, ovate or polyhedral. Both zoœcial apertures and cancelli with thickened cord-like margins, which slightly project and leave small polygonal areas between them. Apertures of zoœcia and of cancelli at times closed at the outer surface by a calcareous plate, pierced by numerous large circular pores. Internodes marked out into irregular ovate or elongate areas which are pierced by numerous large pores, and are bounded by slightly-elevated broad ridges devoid of pores. One or two large apertures, possibly zoœcial, and a large number of smaller apertures occur in each internode. The porous areas apparently mark the position of closed zoœcial apertures in the internodes.

M.C. Upper beds at Maude (T.S.H.).

A broken specimen in my own collection shows that the zoœcia curve upwards and outwards, to open on the surface of the nodes, and that the walls are pierced by a number of large circular pores, placed each at the bottom of a broadly rounded depression, the intervening spaces being minutely granular.

2. *H. pisiformis*, McG. Pl. XXI., fig. 15.

Zoœcium nearly spherical, apparently free. Surface closely covered by rounded polygonal apertures of varying size, so that it is not evident in many cases which are zoœcia and which are cancelli, as all gradations in size are present. Bounding walls of apertures stout. The apertures of all sizes usually closed by a concave porous plate placed slightly within the mouth.

S.P.

Family Frondiporidæ.

"Zoarium massive, stipitate, simple or ramose. Zoœcia tubular, connate, continuous from the base, aggregated into fasciculi, opening only at the extremities or in regular series at the sides of the branches. No cancelli."—(McG.).

Supercytis, *D'Orb.*

"Zoarium stipitate; capitulum expanded, flat or cupped, with numerous furcate or trifid fasciculi projecting round the border. Fasciculi compressed,

constituted of coalesced, almost completely immersed zoœcia of varying lengths, all of which open on the upper flattened side of the fasciculus or at the extremity. Dorsal surface rounded, even, longitudinally striated and minutely punctate. Oœcia (when present) hemispherical, at the base of the fasciculi, and usually on the upper surface."—(Busk).

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? S. digitata, D'Orb. Pl. XXII., figs. 1, 2.

Supercytis digitata, D'Orbigny, P.F.T.C., p. 1061, pl. 798, figs. 6–9; ? Waters, Q.J.G.S., XL., p. 692; *id.*, Q.J.G.S., XLII., p. 344; Busk, C.P., XVII., p. 29; *Fasciculipora digitata*, Busk, B.M.C., III., p. 37.

Zoarium stalked, expanded above into a disc, on the edge of which are the openings of closely-packed zoœcia. From the upper surface of the disc, and slightly within its outer edge, arise eight compressed fasciculi, which are simple or bifid or, in one case, trifid. They rise abruptly from the base so as to give the zoarium a deep cup-shaped form. Their lower inner edges almost meet in the centre of the disc. The zoœcia open along the lower and outer edges and extremities of the fasciculi. The inner surface of the fasciculi is striated, owing to the incomplete fusion of the zoœcia. Between the fasciculi the surface of the disc is marked out by a single row of large oblong transversely-placed pits, the ridges between which run up into the sides of the fasciculi. Oœcium an inflation in the centre of the colony.

B.; Murray Cliffs (W.). Tertiary, New Zealand (W.); Cretaceous, France; Recent, New Zealand.

The broken stalk of attachment is clearly visible in one specimen, and there can thus be no doubt that the zoœcia open on the lower and not on the upper side in the specimens. It does not then seem quite certain that it is D'Orbigny's species, as in the latter the zoœcial openings are on the upper side of the fasciculi, a character which is shown by some recent specimens from New Zealand in the collection. The identification was queried by Dr. MacGillivray in some of his lists, so that he would, perhaps, have remarked upon it.

Fasciculipora, *D'Orb.*

"Zoarium erect, simple or branched or lobate. Zoœcia opening only at the extremities of the branches or in one or more regular series below the extremity."—(McG.).

1. *F. fruticosa*, McG. Pl. XXII., fig. 3.

Fasciculipora fruticosa, McG. T.R.S.V., XX., 1883, 127; *id.*, CV., 34; *id.*, P.Z.V., 157.

"Zoarium branched, the main branches mostly horizontal, with numerous short branches turned upwards, the secondary branches consisting of bundles of zoœcia, all opening by closely-packed prismatic orifices; surface punctate, faintly sulcate longitudinally and (especially in older parts and on the back) transversely corrugated."—(MeG.).

B.

2. *F. disticha*, MeG. Pl. XXII., fig. 5.

Zoœcial tubes prismatic, arranged in lobate folds and along the summits of which they open. Folds very variable in size and shape and indefinitely arranged. Apertures roundedly polyhedral or oblong. Outer walls smooth. Zoœcial tubes connate, but with the line of junction clearly marked by a groove. Apertures at times closed by a concave calcareous plate.

B.

Which is the attached part is not clear from the nature of the specimen, as the zoœcia look in all directions, the lobes being equally developed all round the zoarium.

Frondipora, *Imperato.*

"Zoarium pedunculate, ramose; fasciculi opening only on one side of the branches in raised patches."—(Busk).

Discotubigera, *D'Orb.*

Zoarium discoid, fixed by its base. Zoœcia in two or three rows opening along the summits of biserial radiating ridges.

D. gambierensis, Waters. Pl. XXII., fig. 10.

Parotubigera gambierensis, Waters, Q.J.G.S., XL., p. 692.

"Zoarium apparently adnate. Zoœcia in bundles of two or more, erect connate. Ovicell an inflation of the portion of the surface between the zoœcia; surface of zoœcia evidently finely punctate."—(W.).

M. Mt. Gambier (W.).

The figured specimen is a fragment, the broken edge being the lower one in the figure, while the other edges are entire. The under-surface shows strongly-marked concentric rugæ, the imaginary centre round which they are developed being placed some distance below the broken edge of the figure.

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DESCRIPTION OF PLATES.

LABORATOIRE DE PALEONTOLOGIE

PLATE I.

1. *Catenicella ventricosa*, single zoœcium, front and dorsal.
2. *Catenicella ventricosa*, geminate pair of zoœcia.
3. *Catenicella nobilis*, geminate pair of zoœcia, front and dorsal.
4. *Catenicella ampla*, anterior surface of 7, fenestrate form; 4*a*, posterior surface of same; 4*b*, lateral view.
5. *Catenicella ampla*, anterior and dorsal view of geminate zoœcia of 9, fenestrate form.
6. *Catenicella ampla*, anterior view of géminate pair of zoœcia, 7, fenestrate form.
7. *Catenicella circumcincta*, anterior and dorsal views of single zoœcium.
8. *Catenicella expansa*, single specimen.
9. *Catenicella expansa*, geminate pair of zoœcia.
10. *Catenicella mamillata*, geminate pair of zoœcia.
11. *Catenicella mamillata*, single zoœcium, front and dorsal view.
12. *Catenicella tenuis*, geminate pair of zoœcia.
13. *Catenicella tenuis*, single zoœcium.
14. *Catenicella tenuis*, variety, single zoœcium.
15. *Catenicella pulchella*, geminate pair of zoœcia.
16. *Catenicella elongata*, geminate pair of zoœcia, front and dorsal view.
17. *Catenicella alata*, geminate pair of zoœcia, front and dorsal view.
18. *Catenicella crux*, single zoœcium, front and dorsal view.
19. *Catenicella porosa*.
20. *Catenicella cribraria*, single zoœcium, front and dorsal view.
21. *Catenicella hastata*, geminate pair of zoœcia, front and dorsal view.
22. *Catenicella hastata*, another pair of geminate zoœcia.
23. *Catenicella hastata*, single zoœcium.
24. *Catenicella retroversa*, single zoœcium, front and dorsal view.
25. *Catenicella marginata*, geminate pair of zoœcia, front and dorsal view.
26. *Catenicella marginata*, single zoœcium, front and dorsal view.
27. *Catenicella marginata*, single zoœcium, front and dorsal view.
28. *Catenicella dædala*, geminate pair of zoœcia, front and dorsal view.
29. *Catenicella cincta*, single zoœcium, front and dorsal view.
30. *Catenicella lineata*, single zoœcium, front and dorsal view.
31. *Catenicella latifrons*, geminate pair of zoœcia, front and dorsal view.

PLATE II.

1. *Catenicella intermedia*, geminate pair of zoœcia.
2. *Catenicella lunipora*, single zoœcium, front and dorsal view.
3. *Catenicella ovoidea*, single zoœcium.
4. *Catenicella ovoidea*, geminate pair of zoœcia, front and dorsal view.
5. *Catenicella auriculata*, single zoœcium, front and dorsal view.
6. *Catenicella stricta*, single zoœcium.
7. *Stenostomaria solida*, geminate pair of zoœcia, front and dorsal view; the dorsal view shows the peculiar elevation present in some specimens.
8. *Stenostomaria solida*, posterior view of geminate pair of zoœcia, in which there is no elevation.
9. *Strophipora harveyi*, geminate pair of zoœcia, front and dorsal view.
10. *Strophipora harveyi*, single zoœcium, front and dorsal view.
11. *Strophipora harveyi*, single zoœcium, variety *porosa*.
12. *Strophipora harveyi*, single zoœcium, variety *lata*, front and dorsal view.
13. *Caloporella insignis*, single zoœcium, front and dorsal view.
14. *Caloporella insignis*, geminate pair of zoœcia, front and dorsal view.
15. *Caloporella speciosa*, geminate pair of zoœcia.
16. *Caloporella hannafordi*, single zoœcium.
17. *Caloporella hannafordi*, single zoœcium, another specimen.
18. *Caloporella teres*, geminate pair of zoœcia, front and dorsal view.
19. *Caloporella teres*, single zoœcium.
20. *Caloporella prætennis*, geminate pair of zoœcia, front and dorsal view.
21. *Caloporella sacculata*, geminate pair of zoœcia.
22. *Claviporella vespertilio*, single zoœcium front and dorsal view.
23. *Claviporella longicollis*, geminate pair of zoœcia, variety *angusta*, front and dorsal view.
24. *Claviporella longicollis*, single zoœcium, front and dorsal views.
25. *Claviporella longicollis*, geminate pair of zoœcia, front and dorsal view.
26. *Claviporella obliqua*, single zoœcium, front and dorsal view.
27. *Claviporella marionæ*, geminate pair of zoœcia, front and dorsal view.
28. *Claviporella marionæ*.
29. *Microstomaria tubulifera*, single zoœcium, front and dorsal view.
30. *Catenicella? punctata*, single zoœcium, front and dorsal view.
31. *Ditaxipora internodia*, front and dorsal view. At the lowest part of the former a broken oœcium is seen.

PLATE III.

1. *Liriozoa lævigata*, front and back view.
2. *Bigemellaria pedunculata.*
3. *Bigemellaria pedunculata*, another specimen.
4. *Scrupocellaria crenulata*, front and back view.
5. *Scrupocellaria crenulata*, another specimen, shewing oœcium.
6. *Scrupocellaria crenulata*, specimen shewing the scuta.
7. *Menipea alternata.*
8. *Menipea lineata*, front and dorsal view.
9. *Caberea grandis*, front and back.
10. *Caberea darwinii*, shewing scuta and oœcia.=not C. darwinii - cf Hastings, 4 : 368
11. *Caberea darwinii*, another worn specimen.
12. *Canda fossilis*, different aspects of same specimen.
13. *Canda fossilis*, from another specimen.
14. *Canda fossilis*, shewing oœcia.
15. *Canda inermis*, different views of same specimen.
16. *Cellaria angustiloba*, natural size, 16*a* and magnified.
17. *Cellaria acutimarginata*, natural size and magnified.
18. *Cellaria contigua*, natural size and magnified.
19. *Cellaria australis*, natural size and magnified.
20. *Cellaria rigida.*
21. *Cellaria rigida*, another specimen.
22. *Cellaria rigida*, *var. perampla*, shewing ovarian pores.
23. *Cellaria rigida*, *var. perampla*, shewing avicularium.
24. *Cellaria rigida*, *var. venusta.*
25. *Cellaria divaricata.*
26. *Cellaria gracilis.*
27. *Cellaria laticella.*
28. *Prostomaria gibbericollis*, nat. size; 28*a* anterior view magnified, 28*b* posterior view.

PLATE IV.

1. *Tubucellaria cereoides.*
2. *Tubucellaria marginata*, n.s.; *a* magnified; *b* two zoœcia more highly magnified.
3. *Tubucellaria marginata.*
4. *Plicopora dædala.*
5. *Craspedozoum ligulatum.*
6. *Membranipora radicifera.*
7. *Membranipora radicifera.*
8. *Membranipora intermedia.*
9. *Membranipora striata.*
10. *Membranipora striata var.*
11. *Membranipora marginata.*
12. *Membranipora elliptica.*
13. *Membranipora cyclostoma.*
14. *Membranipora profunda.*
15. *Membranipora macrostoma.*
16. *Membranipora macrostoma.*

PLATE V.

1. *Membranipora sculpta.*
2. *Membranipora geminata.*
3. *Membranipora depressa.*
4. *Membranipora coccinna*, two zoœcia and avicularium.
5. *Membranipora delicatula.*
6. *Membranipora savartii.*
7. *Membranipora savartii.*
8. *Membranipora papyracea.*
9. *Membranipora delicatula, var. aciculata.*
10. *Membranipora perfragilis.*
11. *Membranipora perfragilis.*
12. *Membranipora gregsoni.*
13. *Membranipora gregsoni.*
14. *Membranipora gregsoni.*
15. *Amphiblestrum occultatum.*
16. *Membranipora fossa.*
17. *Biflustra cochleare.*
18. *Biflustra cochleare.*
19. *Amphiblestrum permunitum.*
20. *Amphiblestrum simplex.*
21. *Amphiblestrum arethusa.*
22. *Amphiblestrum bursarium.*

PLATE VI.

1. *Amphiblestrum coriense.*
2. *Amphiblestrum cylindriformis*, natural size and magnified.
3. *Amphiblestrum annulus.*
4. *Farcimia lusoria.*
5. *Farcimia articulata.*
6. *Farcimia ocultata.*
7. *Farcimia oculata.*
8. *Caleschara denticulata*, specimen showing the lateral fissures and cross-bar.
9. *Caleschara denticulata*, natural size, 9*a* group of zoœcia with the central portion and cross-bar worn away.
10. *Thalamoporella rozieri.*
11. *Thalamoporella lata.*
12. *Membranipora ambigua.*
13. *Membranipora bidens.*
14. *Steganoporella magnilabris*, natural size, 14*a* anterior view of group of zoœcia magnified 14*b*, posterior view of two zoœcia.
15. *Steganoporella magnilabris.*
16. *Steganoporella magnilabris.*
17. *Steganoporella depressa.*
18. *Steganoporella lateralis.*
19. *Steganoporella patula*, natural size, 19*a* portion magnified.
20. *Steganoporella patula*, portion of another specimen shewing oœcium and avicularia.

PLATE VII.

1. *Lunulites parvicella*, natural size, 1*a* portion of anterior surface magnified, 1*b* dorsal surface.
2. *Lunulites parvicella*, specimen shewing the two forms of vibracular cells.
3. *Lunulites canaliculata*, anterior and dorsal view.
4. *Lunulites rutella*, natural size, 4*a* anterior surface, 4*b* dorsal view.
5. *Selenaria maculata*, natural size.
6. *Selenaria maculata*, portion of a specimen shewing zoœcia and vibracular cells, 6*a* posterior view of same.
7. *Selenaria maculata*, group of zoœcia from another specimen, 7*a* dorsal view of part of same.
8. *Selenaria punctata*, natural size, 8*a* part of anterior surface, 8*b* dorsal view.
9. *Selenaria punctata*, part of another specimen to shew vibracular cell.
10. *Selenaria squamosa*, anterior view of young specimen magnified.

PLATE VII. *(Continued).*

11. *Selenaria squamosa, var. lucida*, natural size, 11*a* portion of anterior surface magnified, 11*b* dorsal aspect.
12. *Selenaria squamosa*, another specimen, natural size, 12*a* part of anterior surface magnified, 12*b* dorsal aspect.
13. *Selenaria squamosa, var. pulchella*, natural size, 13*a* anterior view of zoœcia, 13*b* posterior aspect.
14. *Selenaria cupola*, natural size, 14*a* anterior view magnified, 14*b* dorsal aspect.
15. *Selenaria concinna*, natural size, 15*a* part of anterior surface magnified shewing two vibracular cells, 15*b* dorsal view.

PLATE VIII.

1. *Lunulites angulopora ?*
2. *Membranipora profunda.*
3. *Macropora centralis.*
4. *Lepralia crassatina.*
5. *Macropora clarkei.*
6. *Macropora clarkei*, natural size, 6*a* three zoœcia magnified.
7. *Lepralia hebetata.*
8. *Cribrilina suggerens.*
9. *Cribrilina radiata.*
10. *Cribrilina cornuta*, shewing an avicularium.
11. *Cribrilina cornuta*, single zoœcium from another specimen.
12. *Cribrilina cornuta*, group of zoœcia from an older specimen.
13. *Cribrilina terminata*, specimen shewing oœcia.
14. *Cribrilina terminata*, another specimen.
15. *Membraniporella tenuicosta.*
16. *Membraniporella tenuicosta*, single zoœcium.
17. *Cribrilina orbicula.*
18. *Cribrilina dentipora.*
19. *Cribrilina elevata*, natural size and magnified.
20. *Corbulipora ornata.*
21. *Corbulipora ornata*, shewing also oœcium.
22. *Hiantopora monoceros*, Busk, sp.
23. *Hiantopora magna.*
24. *Pachystomaria parvipuncta.*
25. *Hiantopora halli*, natural size, 25*a* portion magnified, 25*b* two zoœcia from same, 25*c* end view of zoœcia.

PLATE IX.

1. *Microporella malusii.*
2. *Microporella rudis.*
3. *Microporella ciliata*, 3*a* single zoœcium, shewing pore and avicularium.
4. *Adeona cellulosa*, natural size, 4*a* portion magnified.
5. *Adeona grisea.*
6. *Adeona grisea, var. interdigitata.*
7. *Adeona obliqua*, natural size.
8. *Adeona obliqua*, portion of another specimen magnified, 8*a* edge view shewing vicarious avicularia, 8*b* posterior view two zoœcia.
9. *Adeona obliqua*, another specimen.
10. *Adeona obliqua*, another specimen.
11. *Adeona obliqua*, another specimen, 11*a* posterior view of single zoœcium.
12. *Adeona symmetrica*, natural size, 12*a* magnified.
13. *Adeona mucronata*, natural size, 13*a* magnified.
14. *Adeona mucronata*, another specimen, shewing numerous avicularia.
15. *Adeona clavata*, natural size, 15*a* magnified.
16. *Adeona clavata*, another specimen.
17. *Adeona clavata*, another specimen.
18. *Adeona clavata*, another specimen, natural size, 18*a* magnified, 18*b* thyrostome more highly magnified, shewing commencement of avicularia.
19. *Tessaradoma magnirostris*, group of zoœcia, 19*a* single zoœcium more highly magnified.
20. *Tessaradoma elevata*, 20 posterior view of three zoœcia.
21. *Hiantopora liversidgei*, natural size, 21*a* magnified.
22. *Hiantopora liversidgei, var. porosa*, natural size, 22*a* magnified.
23. *Adeonella triton*, shewing oœcia, 23*a* three zoœcia, one shewing oral denticles.

PLATE X.

1. *Lepralia abdita.*
2. *Lepralia quadrata.*
3. *Lepralia quadrata*, another specimen.
4. *Lepralia rectilineata.*
5. *Lepralia subimmersa.*
6. *Lepralia subimmersa*, another specimen.
7. *Lepralia pachystoma.*
8. *Lepralia pertusa.*
9. *Lepralia nodulosa.*
10. *Lepralia nodulosa ?*
11. (Undetermined).
12. *Lepralia elongata.*
13. *Lepralia elongata.*
14. *Lepralia preclara.*
15. *Lepralia perforata.*
16. *Lepralia duplex.*
17. *Lepralia graysoni.*
18. *Lepralia rotundata.*
19. *Lepralia vallata.*
20. *Lepralia vermicularis.*
21. *Lepralia gippslandii.*
22. *Lepralia vagans.*
23. *Lepralia cava.*
24. *Lepralia hamiltoniensis.*
25. *Lepralia spatulata.*
26. *Lepralia corrugata.*
27. *Hianlopora magna.*
28. *Lepralia filiformis.*

PLATE XI.

1. *Schizoporella cecilii.*
2. *Schizoporella phymatopora*, *a* magnified.
3. *Schizoporella phymatopora ?*
4. *Schizoporella plagiostoma*, *a* magnified.
5. *Schizoporella lata.*
6. *Schizoporella rugosa.*
7. *Schizoporella australis*, *a* magnified.
8. *Schizoporella submersa*, *a* magnified.
9. *Schizoporella submersa.*
10. *Schizoporella schizostoma.*
11. *Schizoporella schizostoma.*
12. *Schizoporella strictifissa.*
13. *Schizoporella crenulata.*
14. *Schizoporella profunda.*
15. *Schizoporella dædala.*
16. *Schizoporella auriculata*; *a* œcium.
17. *Schizoporella subsinuata.*
18. *Schizoporella ridleyi.*
19. *Schizoporella arachnoides.*
20. *Schizoporella biaperta.*
21. *Schizoporella convexa.*
22. *Schizoporella nitens.*
23. *Schizoporella bombycina.*
24. *Schizoporella rostrata*, anterior view; *a* posterior.
25. *Schizoporella allata.*
26. *Schizoporella foveata.*
27. *Schizoporella granulata.*
28. *Gemellipora elegantissima.*
29. *Gemellipora polita.*

PLATE XII.

1. *Bipora cancellata*, n.s., *a* anterior, *b* posterior.
2. *Bipora philippinensis*, n.s., *a* anterior, *b* posterior.
3. *Lepralia bairnsdatei.*
4. *Lepralia continua.*
5. *Lepralia obliqua.*
6. *Porella concinna.*
7. *Porella concinna.*
8. *Porella punctata.*
9. *Porella marsupium.*
10. *Porella punctata.*
11. *Porella punctata.*
12. *Porella flabellaris.*
13. *Porella innocua.*
14. *Smittia transversa.*
15. *Smittia depressa.*
16. *Smittia cribraria.*
17. *Smittia cribraria.*
18. *Smittia ordinata*, n.s., *a* magnified.
19. *Smittia ordinata*, oœcium.
20. *Smittia reticulata, var. nitida.*
21. *Smittia reticulata, var. calceolus.*
22. *Smittia oculata.*
23. *Smittia modesta.*
24. *Smittia bi-incisa.*
25. *Smittia lateralis.*
26. *Smittia tatei*, n.s., *a* magnified.
27. *Smittia tatei*, posterior surface.
28. *Smittia tatei, var.* n.s., *a* magnified.
29. *Smittia tatei*, n.s., *a* magnified.
30. *Smittia areolata*, *a* posterior surface of zoœcium.

PLATE XIII.

1. *Smittia porinoides.*
2. *Phylactella porosa.*
3. *Mucronella lata.*
4. *Mucronella vultur* (?)
5. *Mucronella apiculata.*
6. *Mucronella præstans.*
7. *Mucronella teres.*
8. *Mucronella spongiosa.*
9. *Mucronella mooraboolensis.*
10. *Bracebridgia emendata.*
11. *Bracebridgia emendata*, n.s., *a* magnified.
12. *Aspidostoma crassum*, n.s., *a* magnified.
13. *Cucullipora tetrasticha*, n.s., *a* magnified, *b* lateral view.
14. *Plagiopora disticha*, n.s., *a* anterior surface, *b* posterior, *c* more highly magnified.
15. *Bulbipora areolata.*
16. *Rhynchopora bispinosa.*
17. *Rhynchopora longirostris.*
18. *Rhynchopora longirostris.*
19. *Rhynchopora spinifera.*
20. *Bitectipora lineata.*

PLATE XIV.

1. *Lekythopora hystrix.*
2. *Lekythopora hystrix*, oœcium.
3. *Cellepora abdita.*
4. *Cellepora tri-denticulata.*
5. *Cellepora tri-denticulata.*
6. *Cellepora tri-denticulata, var. nummularia*, n.s. and magnified.
7. *Cellepora serrata*, n.s. and magnified.
8. *Cellepora fossa*, n.s. and magnified.
9. *Cellepora fossa.*
10. *Cellepora fossa.*
11. *Cellepora albirostris.*
12. *Schismopora costata.*
13. *Schismopora modesta.*
14. *Schismopora granum, a*, oœcium.
15. *Schismopora incus*, n.s. and magnified.
16. *Haswellia producta.*
17. *Haswellia producta.*
18. *Haswellia producta.*
19. *Haswellia producta.*
20. *Haswellia longirostris.*
21. *Porina gracilis*, n.s. and magnified.
22. *Porina gracilis*, n.s. and magnified.
23. *Porina gracilis.*
24. *Porina gracilis.*
25. *Porina cribraria.*
26. *Porina larvalis.*
27. *Lepralia corrugata.*
28. *Lepralia monilifera.*

PLATE XV.

1. *Retepora sinuosa.*
2. *Retepora aciculifera.*
3. *Retepora aciculifera.*
4. *Retepora aciculifera.*
5. *Retepora lineata.* × 30.
6. *Retepora schnapperensis.*
7. *Retepora beaniana.*
8. *Retepora beaniana.*
9. *Retepora fissa.*
10. *Retepora fissa.*
11. *Retepora tesellata, var. benemunita.*
12. *Retepora rimata.*
13. *Retepora rimata.*
14. *Retepora bairnsdalei.* × 30.
15. *Retepora porcellana.* × 30.
16. *Retepora subimmersa.* × 30.
17. *Retepora permunita.* × 30.
18. *Retepora permunita.* × 30.
19. *Retepora coriensis.* × 30.

PLATE XVI.

1. *Crisia scalaris*, anterior and posterior.
2. *Crisia acropora.*
3. *Crisia macrostoma.*
4. *Crisia macrostoma.*
5. *Crisia gracilis.*
6. *Crisia setosa.*
7. *Crisia tenuis.*
8. *Crisia acropora*, oœcium.
9. *Crisia acropora.*
10. *Crisia eburnea.*
11. *Crisia setosa.*
12. *Idmonea hochstetteriana*, n.s. and magnified.
13. *Idmonea hochstetteriana*, n.s.
14. *Idmonea hochstetteriana*, oœcium.
15. *Idmonea hochstetteriana*, var. n.s.
16. *Idmonea hochstetteriana*, var. n.s. and magnified.
17. *Idmonea atlantica*, n.s. and anterior and posterior magnified.
18. *Idmonea radians*, n.s., *a* magnified, *b* more highly back and front.
19. *Idmonea incurva*, n.s. and magnified.
20. *Idmonea serialis*, n.s. and magnified.

PLATE XVII.

1. *Idmonea milneana*, n.s. and front and back magnified.
2. *Idmonea milneana*, n.s. and magnified.
3. *Idmonea lata*, n.s. and magnified.
4. *Idmonea contorta*, n.s. and magnified.
5. *Idmonea contorta.*
6. *Idmonea trigona*, n.s. and magnified.
7. *Idmonea geminata*, n.s. and magnified.
8. *Idmonea atlantica*, n.s. and magnified.
9. *Idmonea venusta*, n.s. and magnified.
10. *Idmonea venusta.*

PLATE XVIII.

1. *Idmonea divergens*, n.s. and magnified.
2. (Undetermined).
3. *Idmonea conferta*, n.s. and magnified.
4. *Idmonea semispiralis*, n.s. and magnified.
5. *Filisparsa orakeiensis*, n.s. and magnified.
6. *Hornera curva*, n.s. and magnified.
7. *Hornera frondiculata*, n.s. and magnified.
8. *Hornera frondiculata.*
9. *Hornera elevata*, n.s. and magnified.
10. *Hornera quadrata*, n.s. and magnified.

PLATE XIX.

1. *Hornera foliacea*, n.s. and magnified.
2. *Hornera sulcata*, n.s. and magnified.
3. *Hornera involuta*, n.s. and magnified.
4. *Hornera tenuis*, n.s. and magnified.
5. *Hornera diffusa*.
6. *Hornera sulcata*, n.s. and magnified.
7. *Hornera frondiculata, var. aperta*, n.s. and magnified.
8. *Hornera tuberculata*, n.s. and magnified.
9. *Hornera prominens*, n.s. and magnified.

PLATE XX.

1. *Stomatopora geminata*.
2. *Stomatopora mæandrina*.
3. *Diastopora discoidea*.
4. *Diastopora patina*.
5. *Diastopora patina*, oœcium.
6. *Diastopora recta*.
7. *Diastopora torquata*.
8. *Liripora bicolor*.
9. *Tecticavea schnapperensis*.
10. *Entalophora australis*, n.s. and magnified.
11. *Entalophora australis*, oœcium.
12. *Entalophora verticillata*.
13. *Entalophora verticillata*.
14. *Entalophora longipora*.
15. *Entalophora longipora*.

PLATE XXI.

1. *Entalophora multipora*.
2. *Entalophora punctata*, n.s. and magnified.
3. *Lichenopora hispida*.
4. *Lichenopora radiata*.
5. *Lichenopora radiata*.
6. *Lichenopora australis*.
7. *Lichenopora reticulata*.
8. *Lichenopora echinata*.
9. *Lichenopora porosa*.
10. *Lichenopora wilsoni*.
11. *Lichenopora wilsoni*.
12. *Lichenopora cribraria*.
13. *Discofascigera tubulifera*.
14. *Heteropora nodulosa*.
15. *Heteropora pisiformis*.

PLATE XXII.

1. *Supercytis digitata*.
2. *Supercytis digitata*.
3. *Fasciculipora fruticosa*.
4. *Liripora fasciculata*.
5. *Fasciculipora disticha*.
6. *Liripora superposita*.
7. *Liripora fasciculata*.
8. *Frondipora palmata*.
9. *Frondipora palmata*.
10. (Undetermined; specimen missing.)
11. *Discotubigera gambierensis*.
12. *Membranipora cyclostoma*.
13. *Lunulites biformis*.
14. *Cellaria dennanti*.
15. *Cellaria cucullata*.

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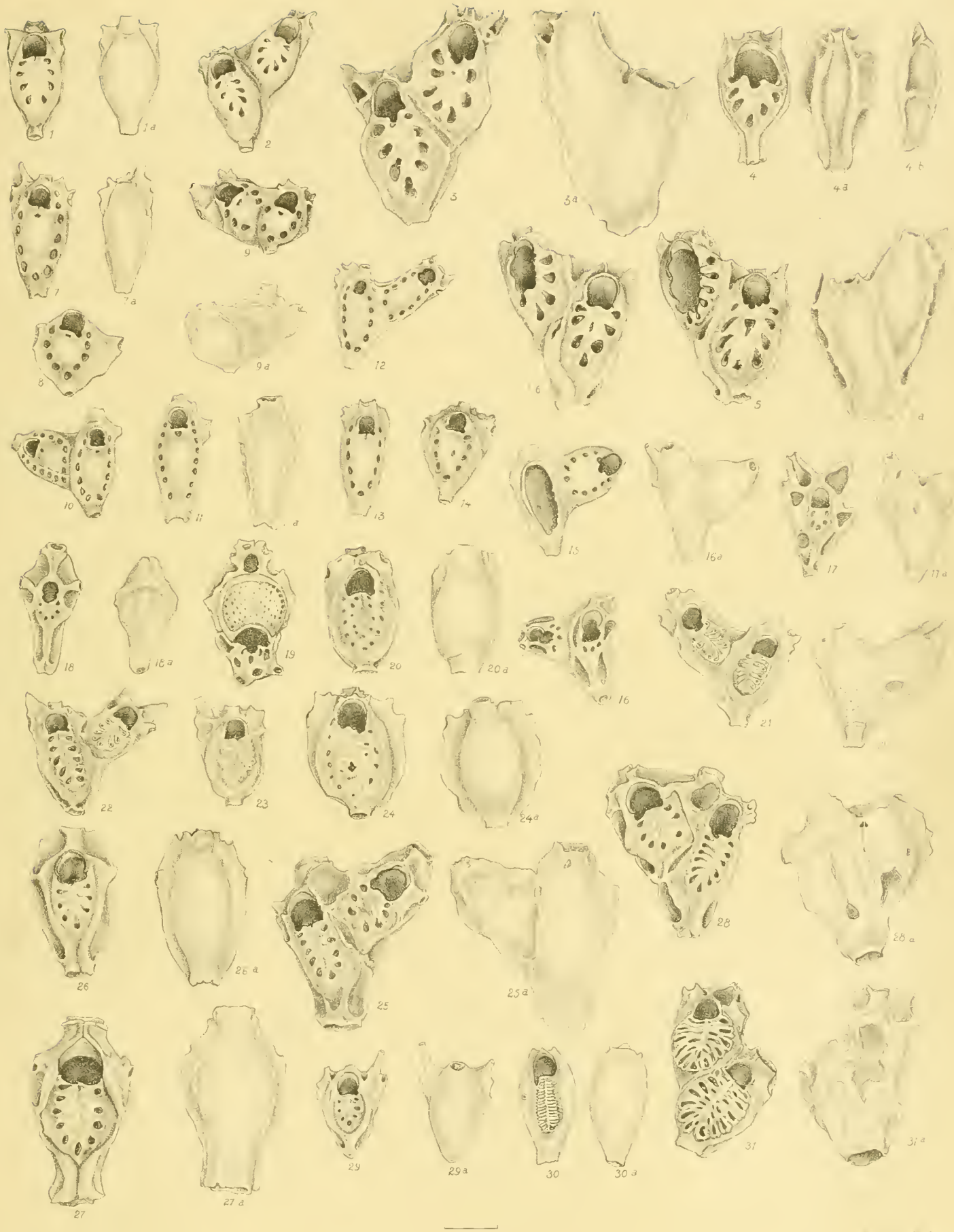

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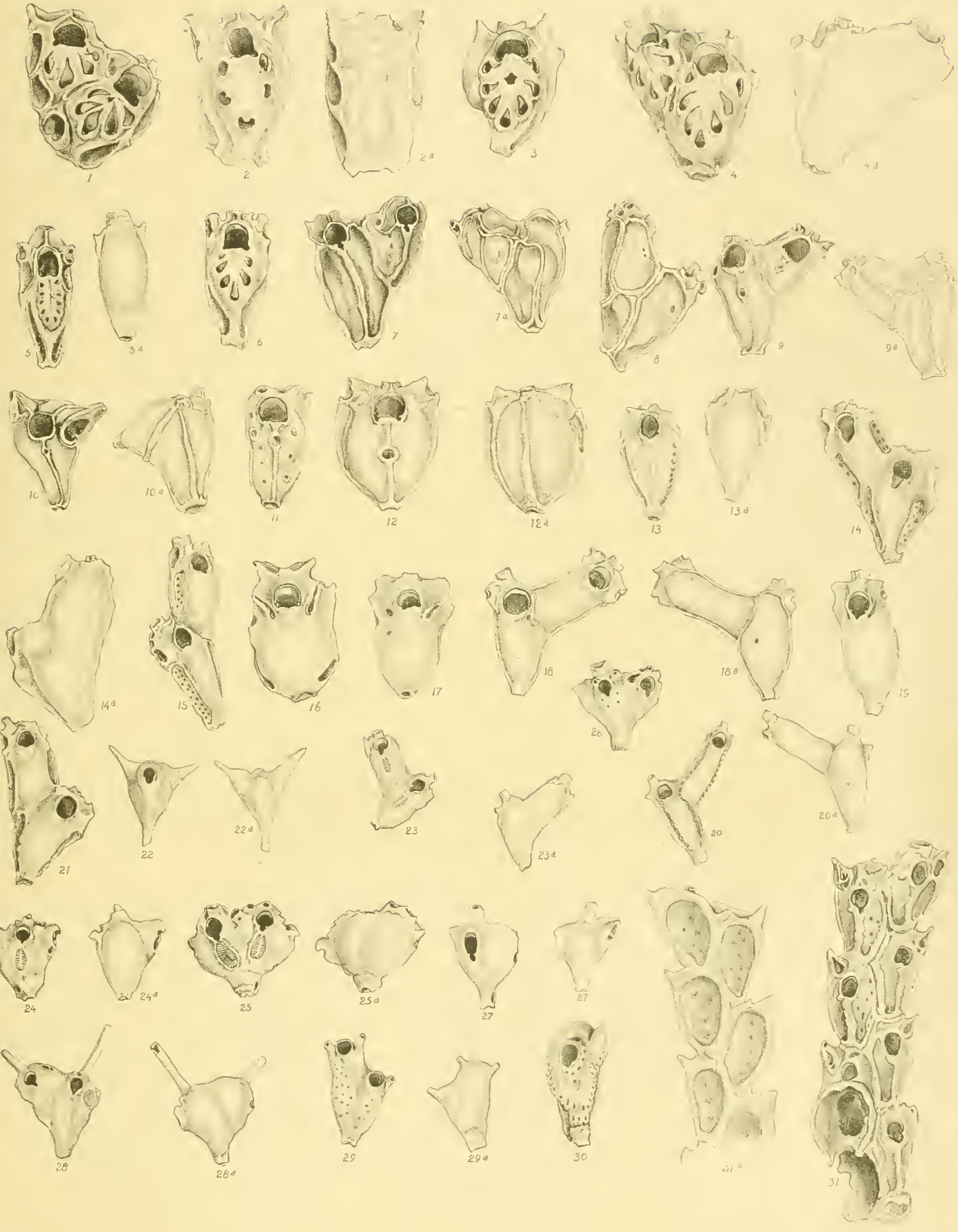

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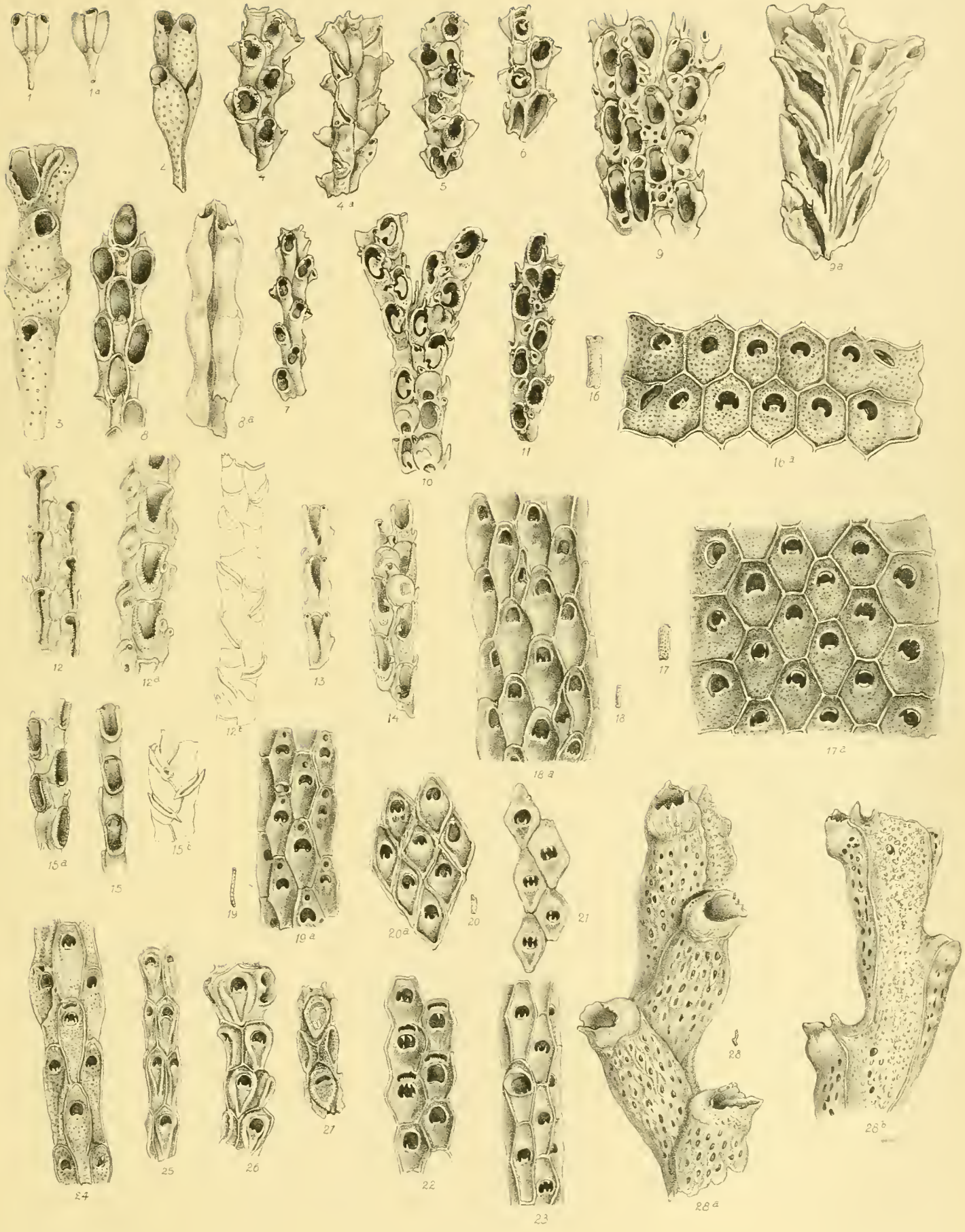

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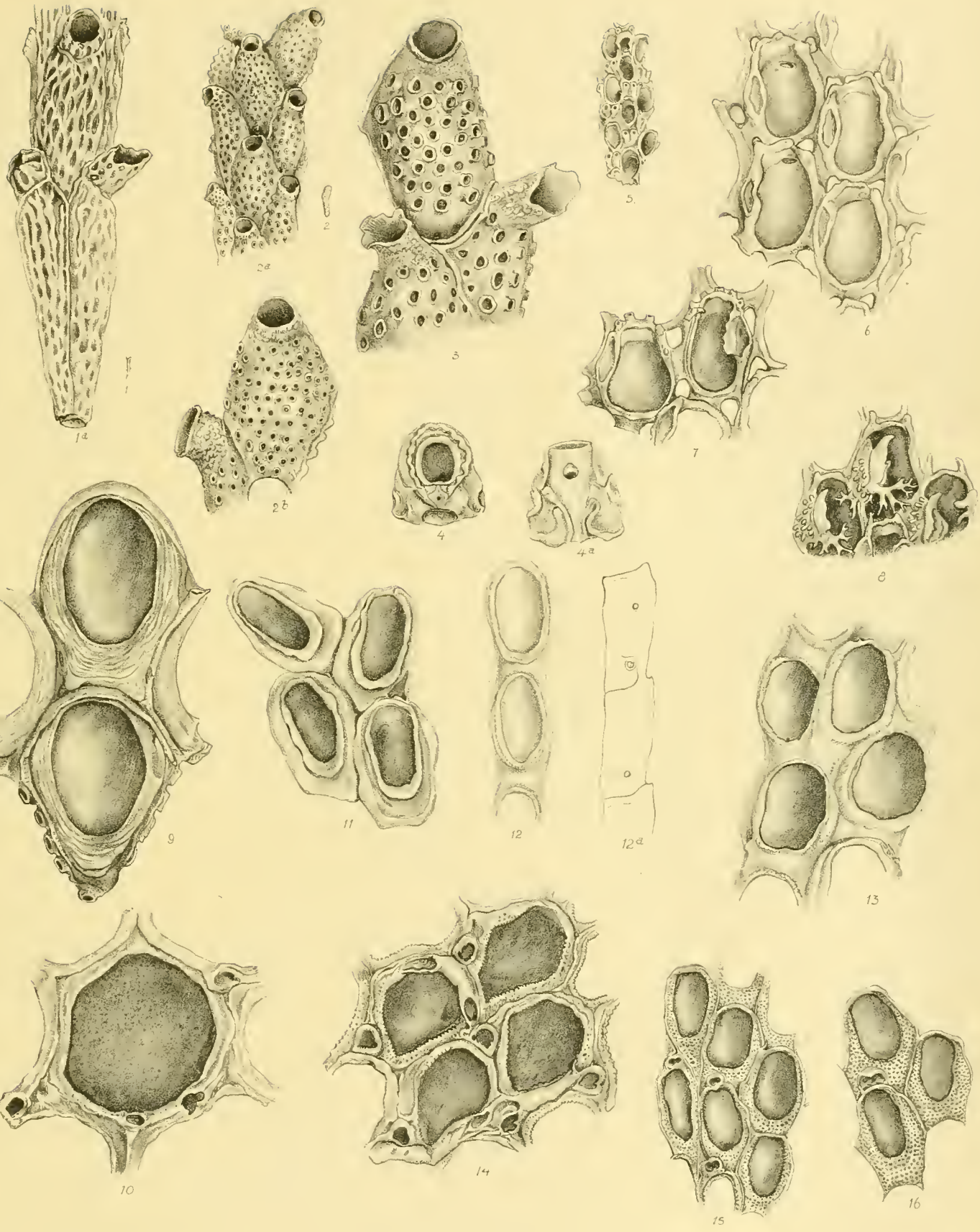

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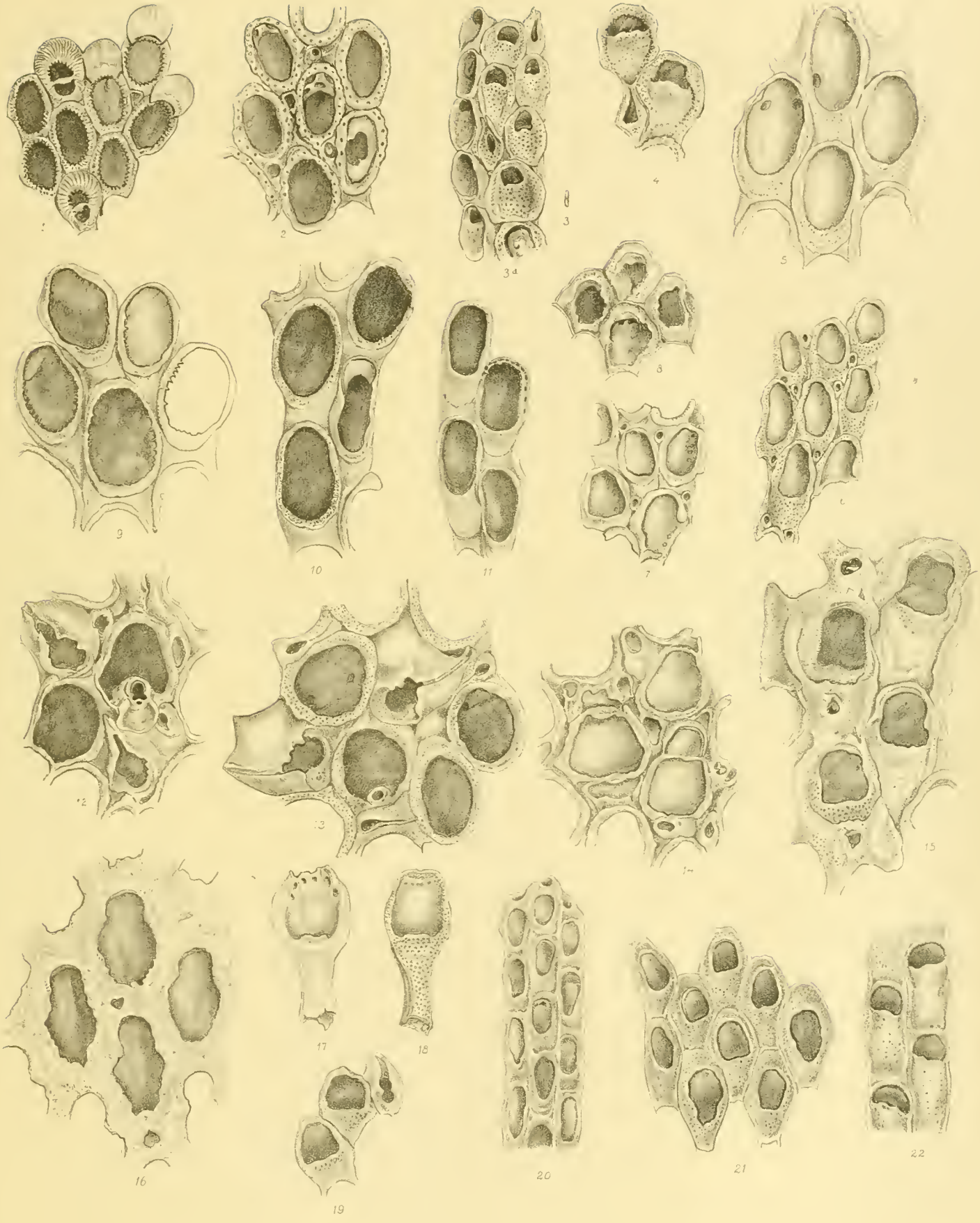

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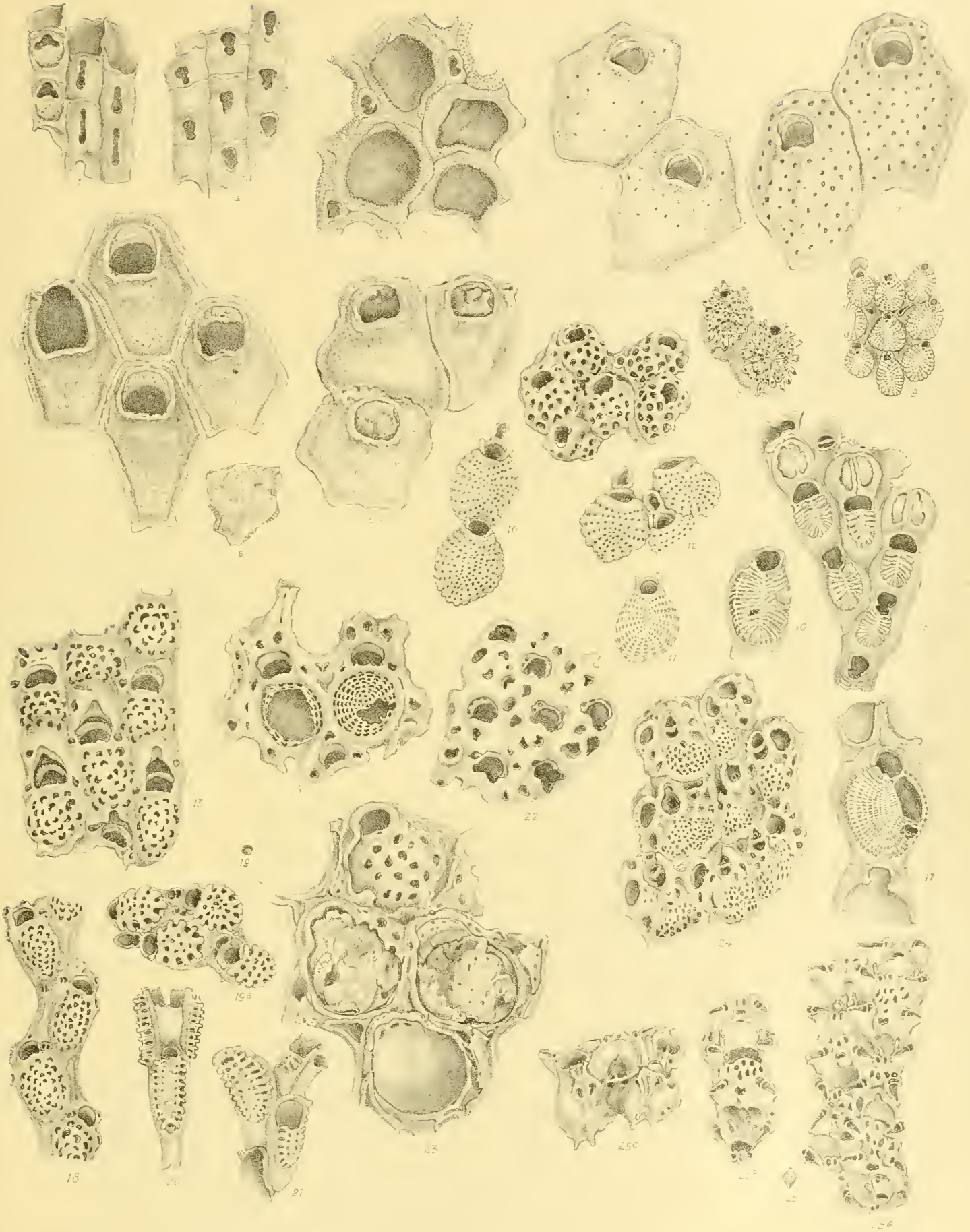

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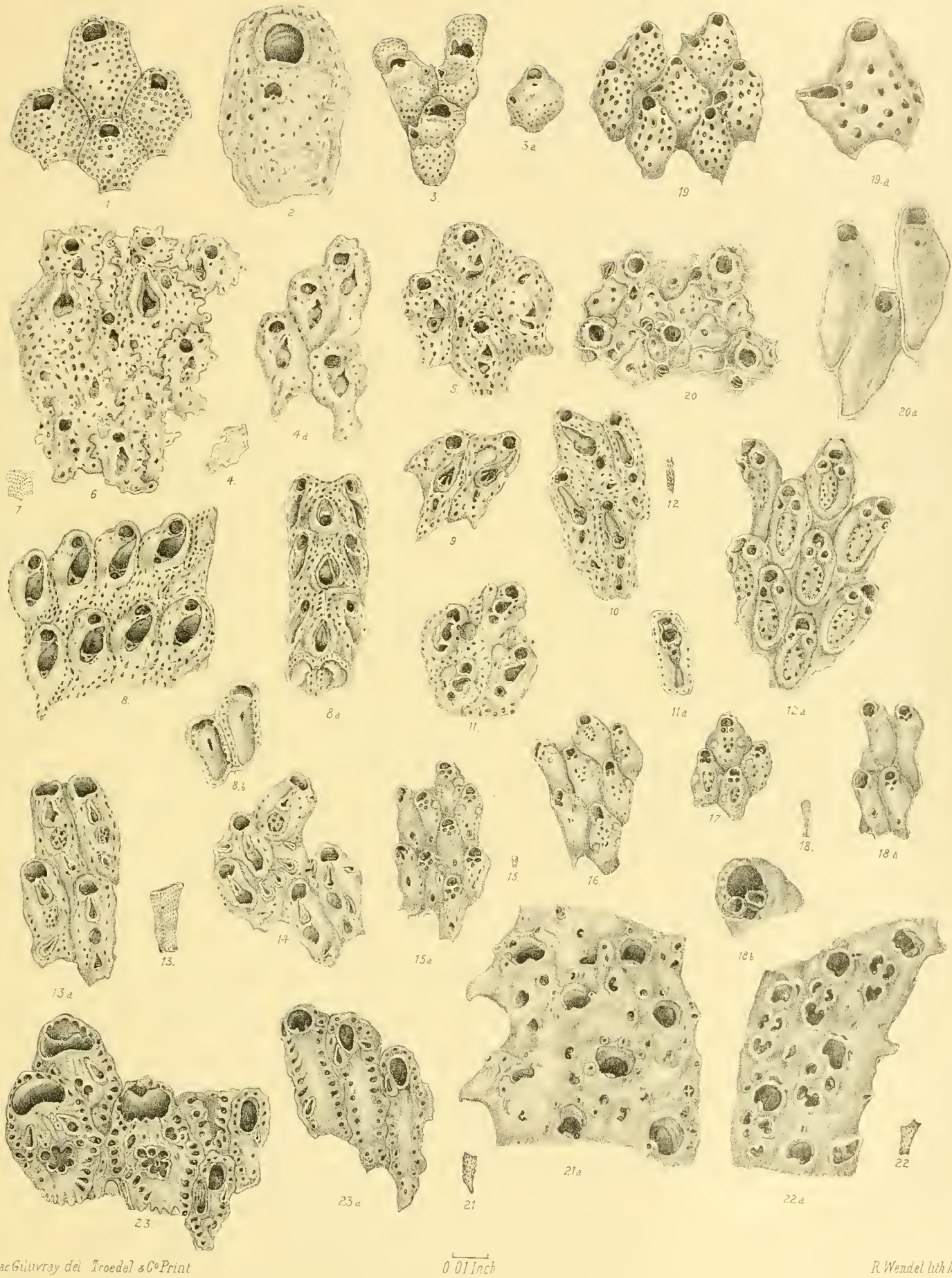

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Plate X

1. Lepralia abdita
2. L. quadrata
3. L. quadrata, another specimen
4. L. rectilineata
5. L. subimmersa
6. L. subimmersa, another specimen
7. L. pachystoma
8. L. pertusa
9. L. nodulosa
10. L. nodulosa?
11. Undetermined
12. L. elongata
13. L. elongata
14. Lepralia preclara
15. L. perforata
16. L. duplex
17. L. graysoni
18. L. rotundata
19. L. vallata
20. L. vermicularis
21. L. gippslandii
22. L. vagans
23. L. cava
24. L hamiltoniensis
25. L. spatulata
26. L corrugata
27. Hiantopora magna.
28. Lepralia filiformis

PLATE XI.

1. Schizoporella cecelii
2. S. phymatopora, a magnified
3. S. phymatopora?
4. S. plagiostoma, a magnified
5. S. lata
6. S. rugosa
7. S. australis, a magnified
8. S. submersa, a magnified
9. S. submersa
10. S. schizostoma
11. S. schizostoma
12. S. strictifissa
13. S. crenulata
14. S. profunda
15. Schizoporella daedala
16. S. auriculata; a ooecium
17. S. subsinuata
18. S. ridleyi
19. S. arachnoides
20. S. biaperta
21. S. convexa
22. S. nitens
23. S. bombycina
24. S. rostrata, amterior view,; a posterior
25. S. allata
26. S. foveata
27. S. granulata
28. Ge ellipora elegantissima
29. G. polita

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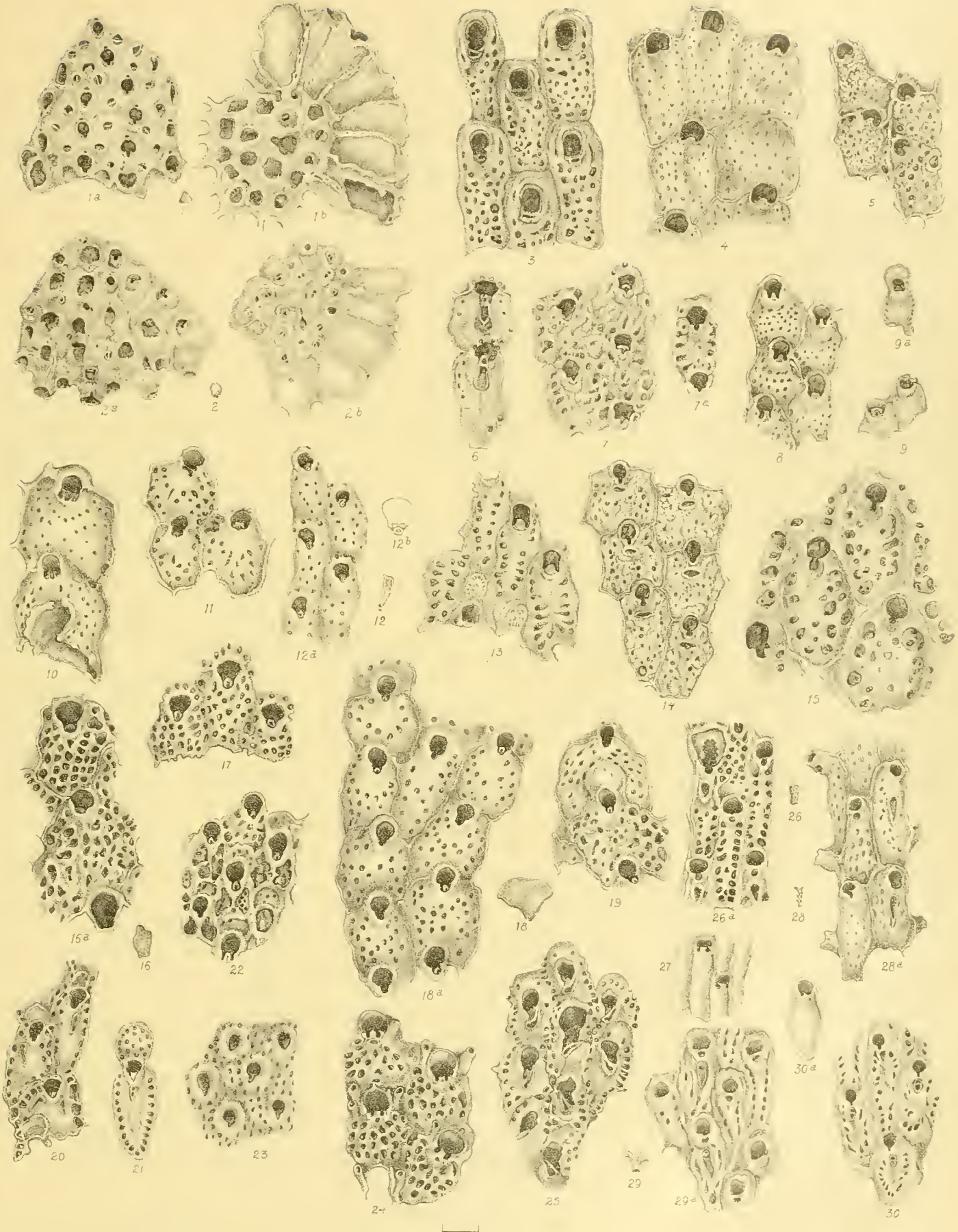

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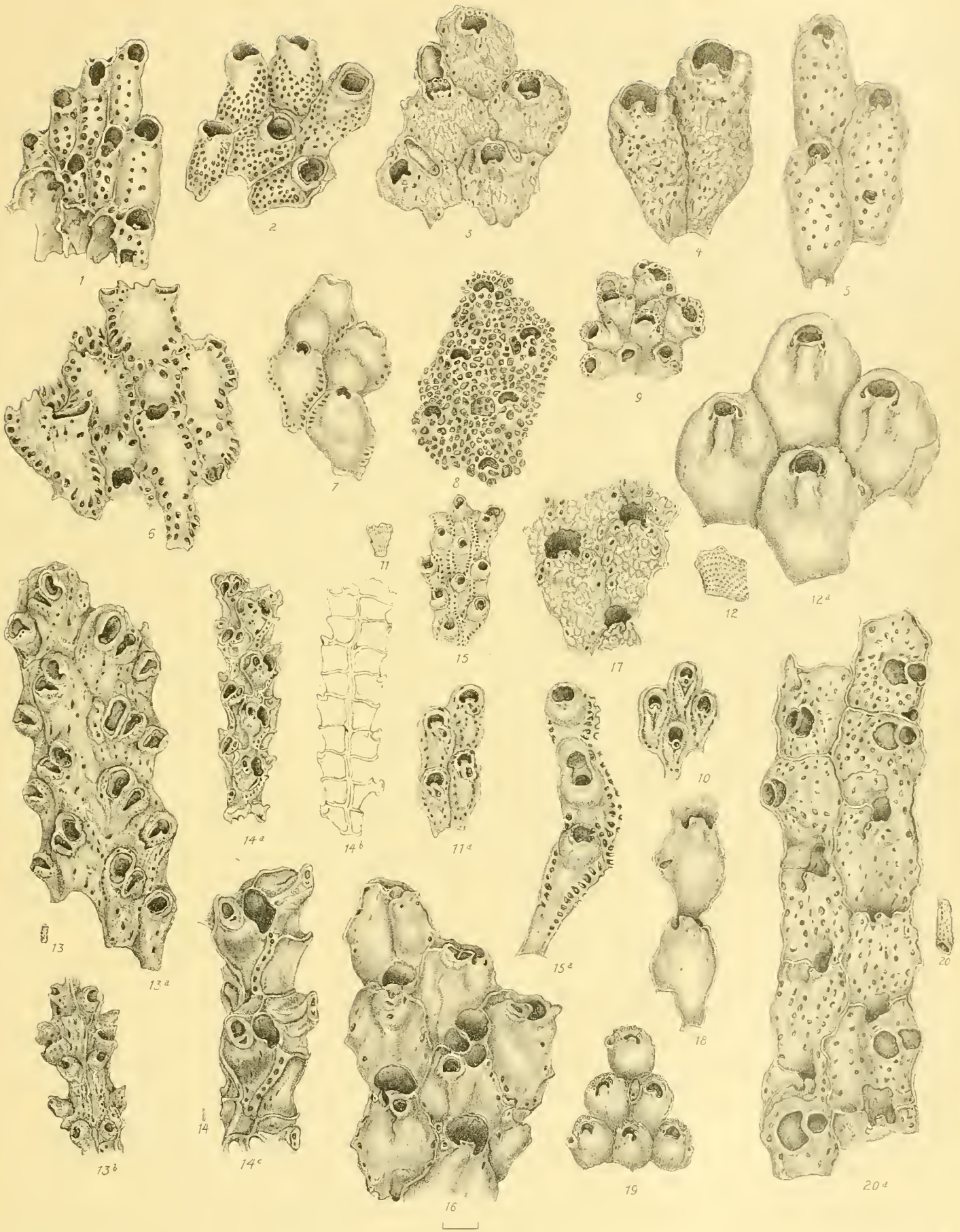

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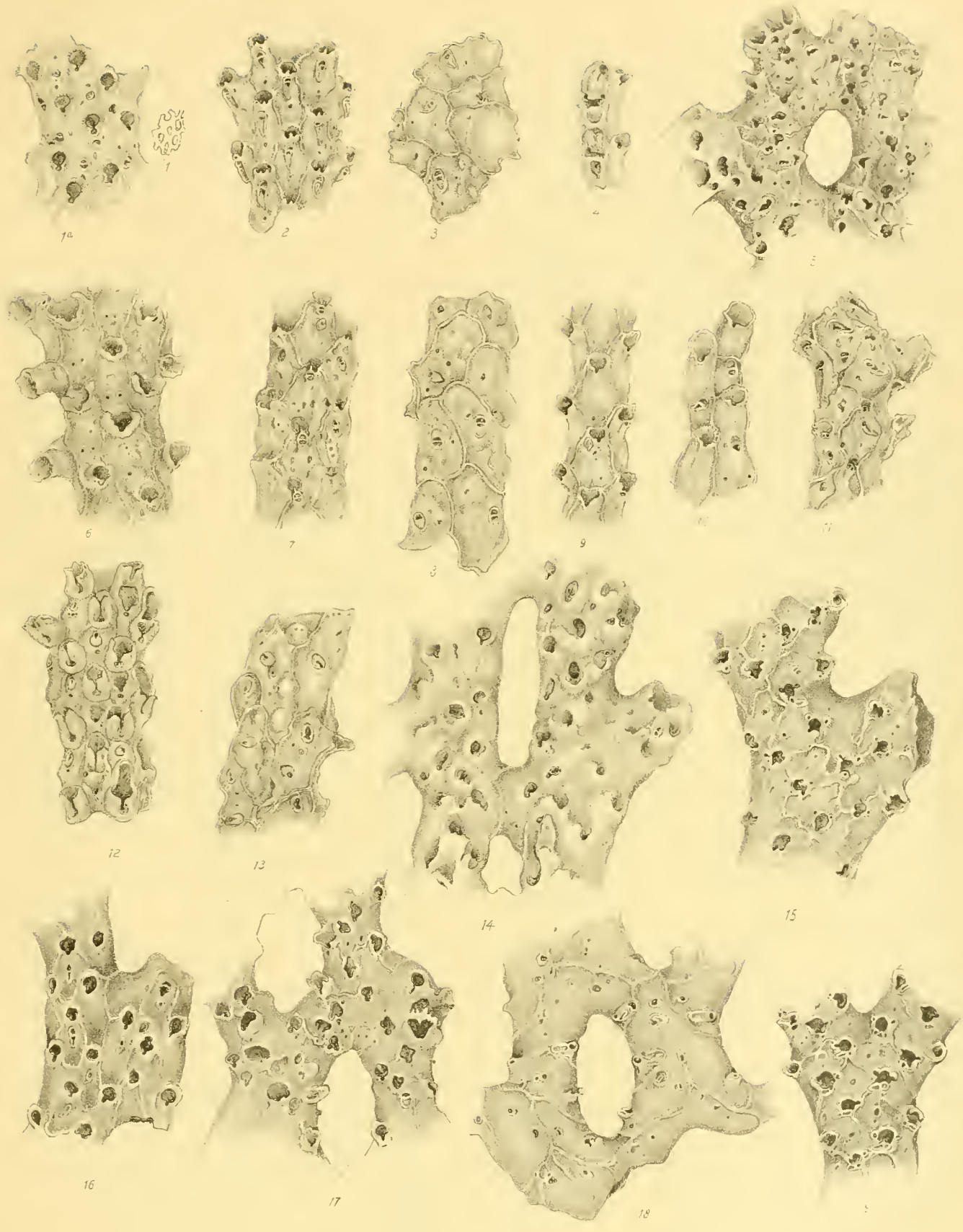
R Wendel lith Melb



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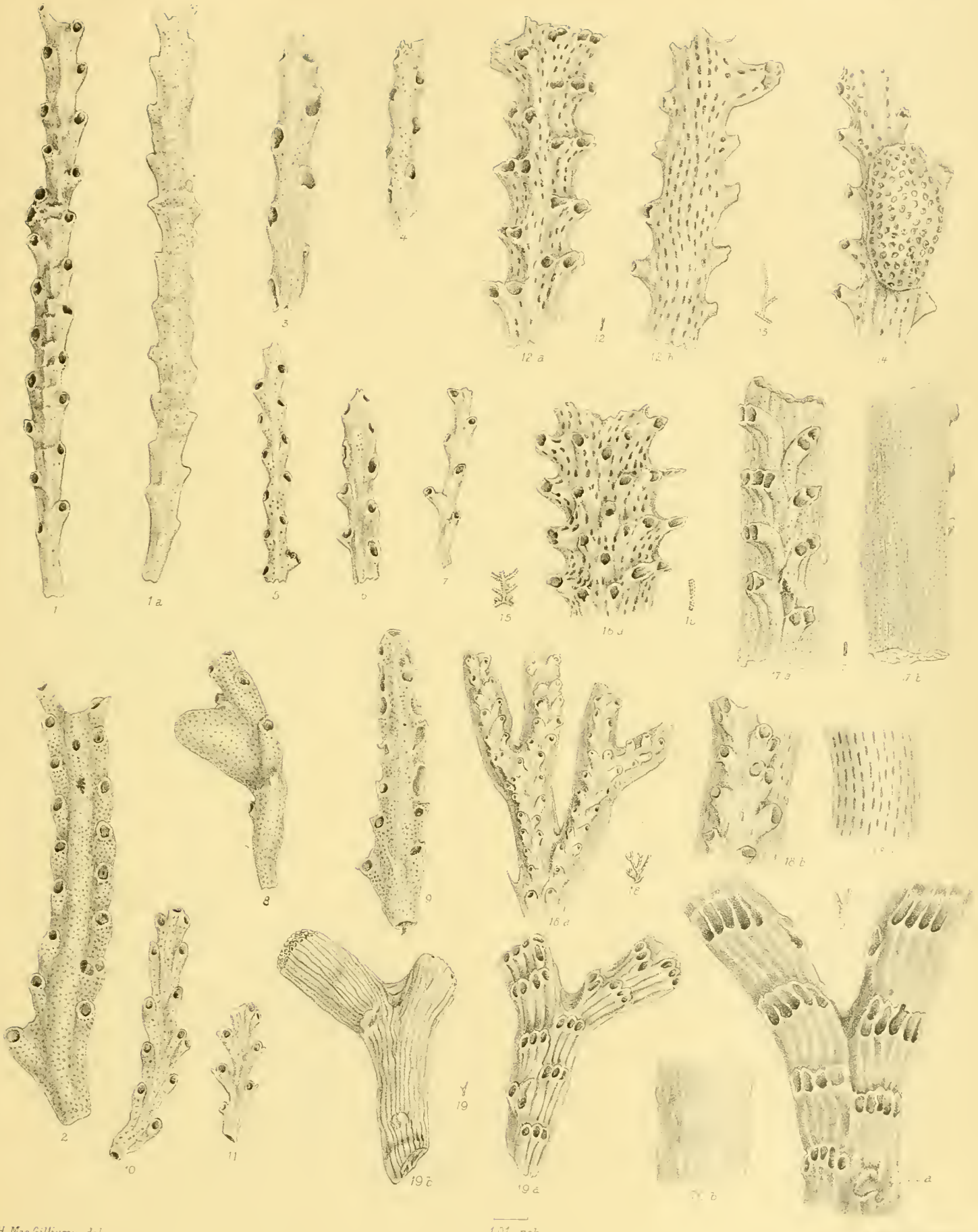

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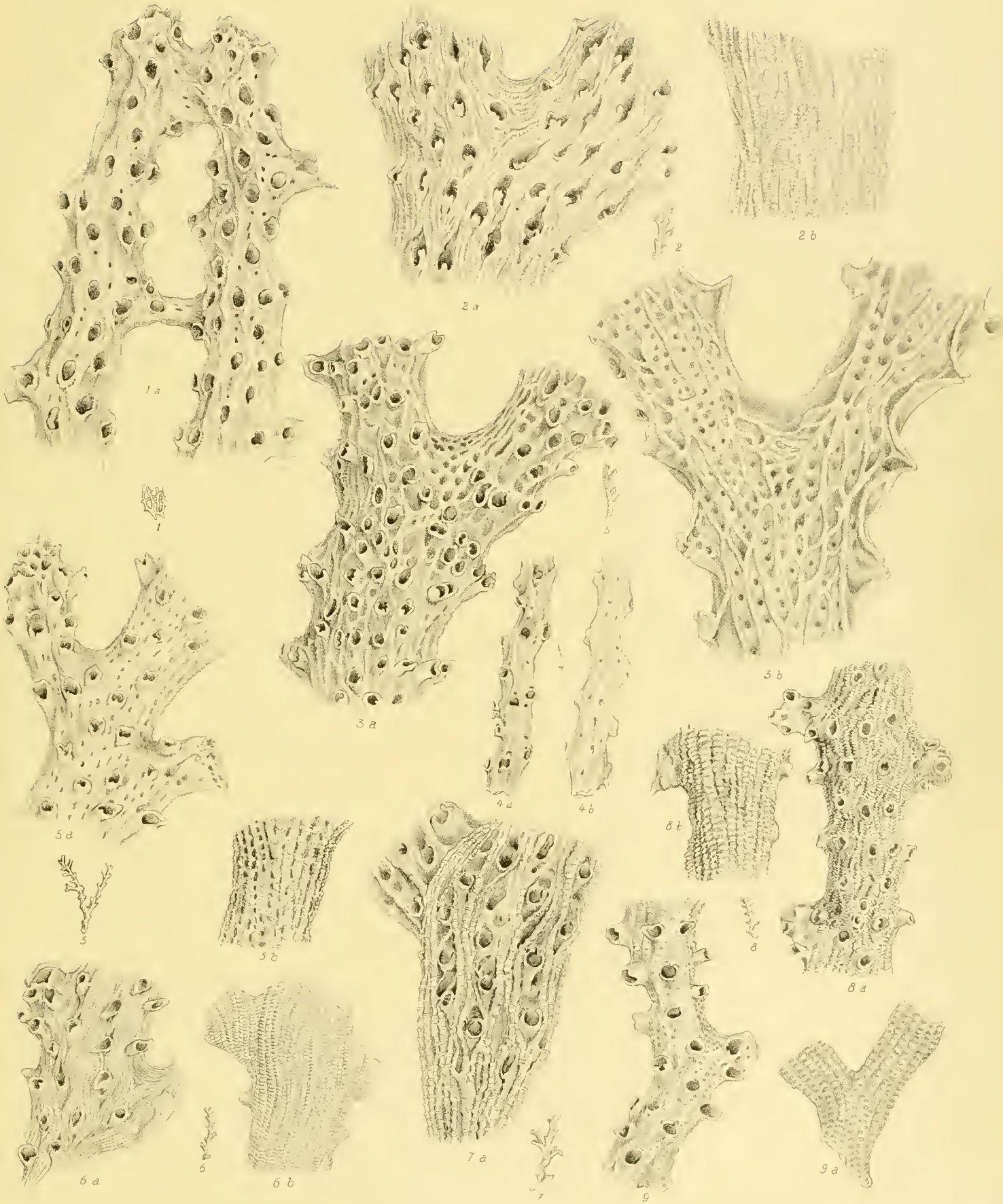

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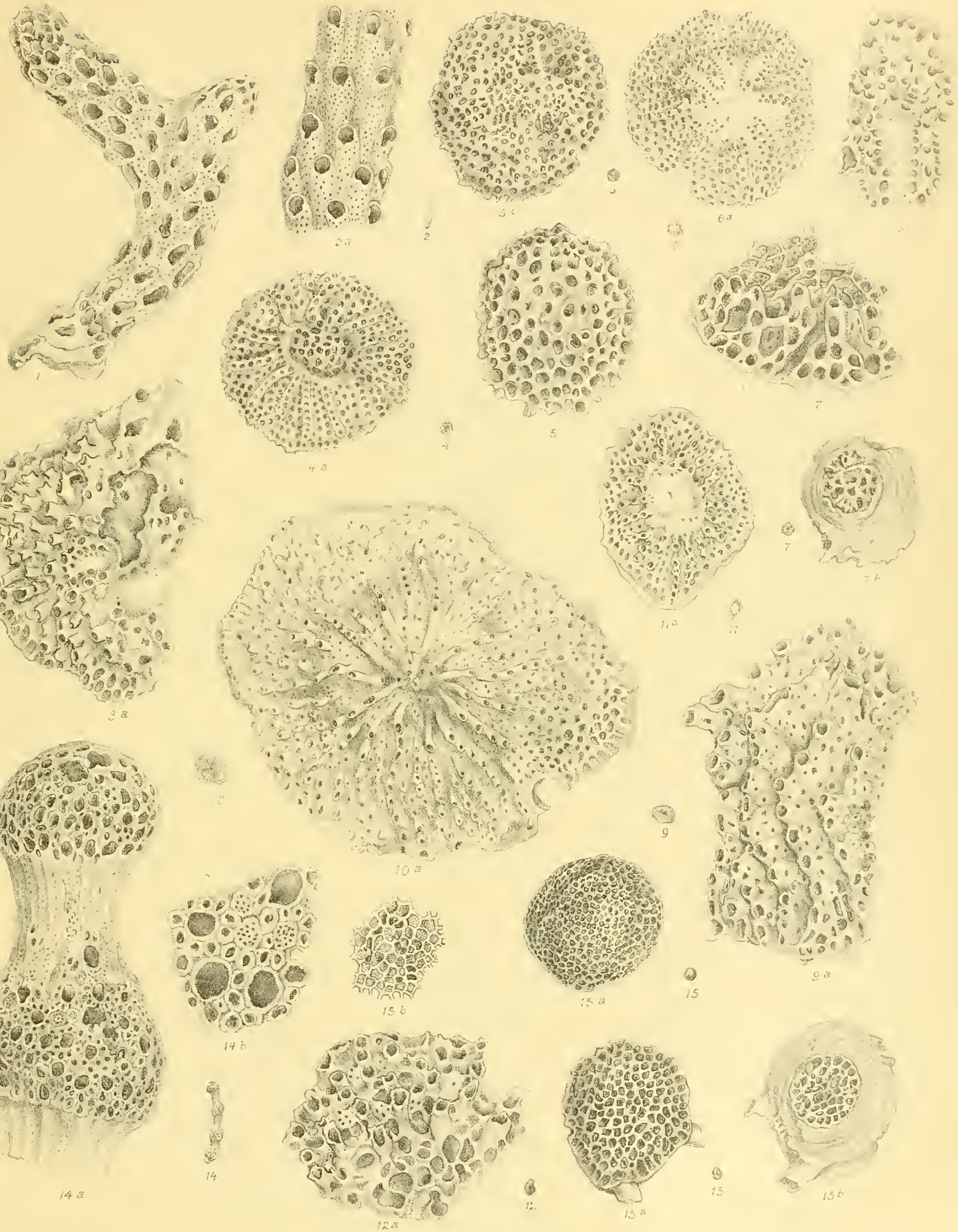

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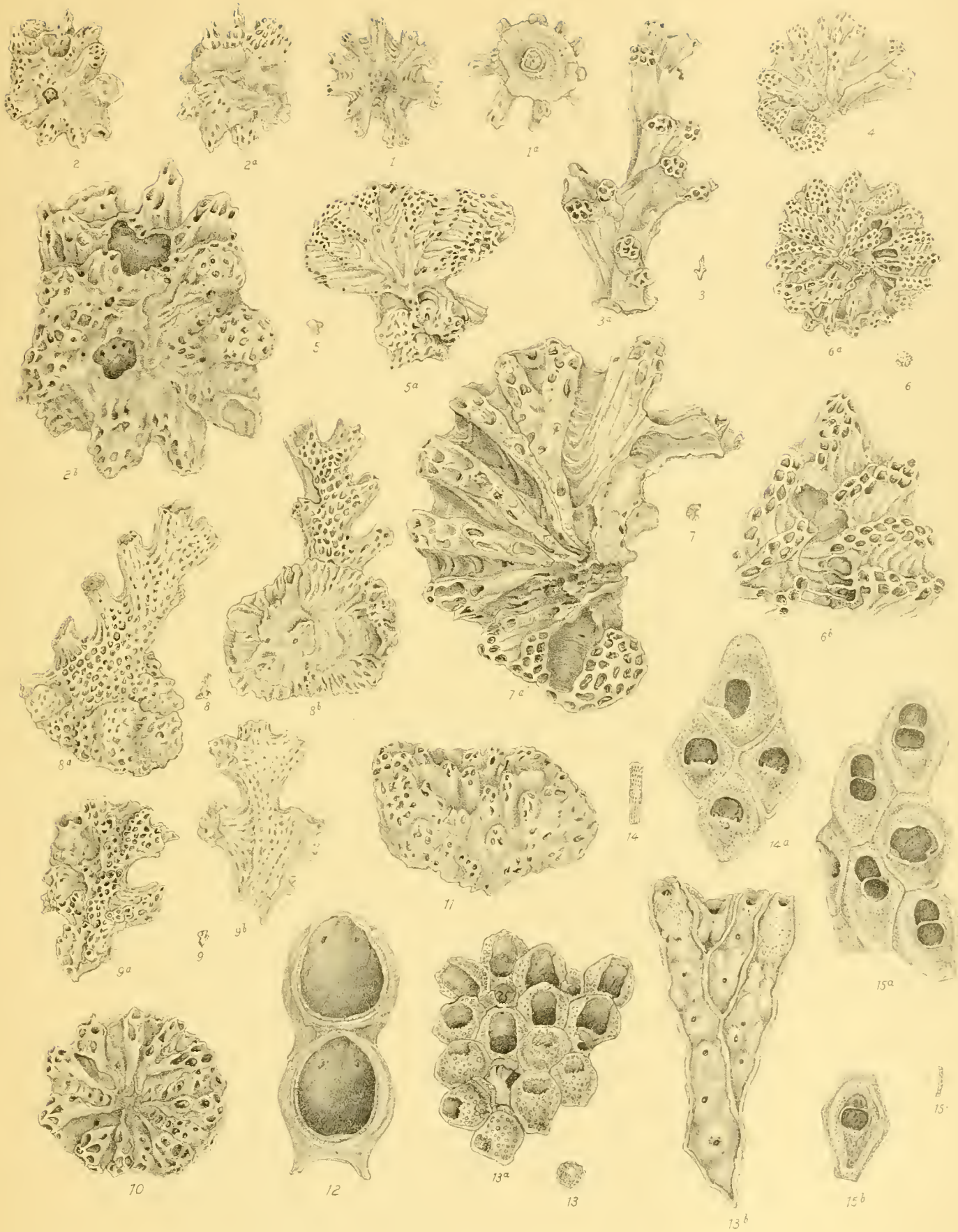

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